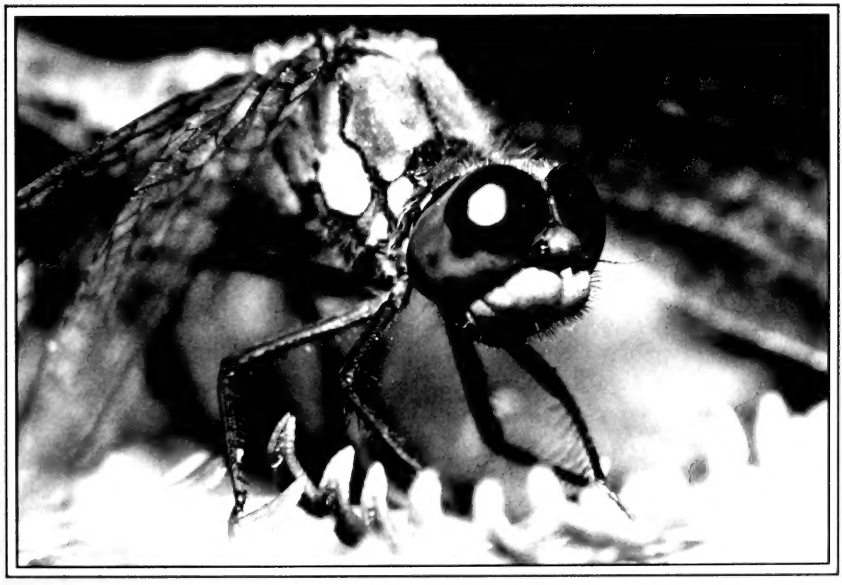
h 2000 ISSN 0952-7583 Vol. 13, Part 1

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY



BRITISH ENTOMOLOGICAL & NATURAL HISTORY SOCIETY

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY

Published by the British Entomological and Natural History Society and incorporating its Proceedings and Transactions

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British Journal of Entomology and Natural History is published by the British Entomological and Natural History Society, Dinton Pastures Country Park, Davis Street, Hurst, Reading, Berkshire RG10 0TH, UK. Tel: 01189-321402. The Journal is distributed free to BENHS members.

Typeset by Dobbie Typesetting Limited, Tavistock, Devon.
Printed in England by Henry Ling Ltd, Dorchester, Dorset.

BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY

Registered charity number: 213149

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Cover illustration: *Sympetrum sanguineum* (odonata)
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THE MIMICRY BETWEEN BRITISH SYRPHIDAE (DIPTERA) AND ACULEATE HYMENOPTERA

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Abstract. Fifty-nine pairs of British hoverflies (Syrphidae) and bees or wasps (Hymenoptera) have been identified, which have similarities in morphology and colour pattern such that they may be examples of mimicry, with the hoverfly being a Batesian mimic of the hymenopteran. The study involved museum specimens supplemented by ecological and behavioural information in the literature, together with the experience of the insects in the field by a syrphid specialist and a hymenopteran specialist. In some cases field observations support the suggestion based on museum specimens that mimicry occurs, while in others field observations suggest that a different hymenopteran is actually the model. Two levels of similarity of hoverflies to Hymenoptera have been recognised, *specific* mimicry, where there is a detailed resemblance in colour, morphology and behaviour to one or a few species of bee or wasp, and *non-specific* mimicry, where the resemblance is more general and much less precise, often to a group of hymenopterans rather than to one species.

INTRODUCTION

Hoverflies are widely accepted as being mimics of Hymenoptera (e.g. Kormann, 1988; Stubbs & Falk, 1983; Heal, 1979), and some authors have described the resemblance of syrphids to particular models, e.g. Dittrich *et al.* (1993) in Britain and Waldbauer (1970) in the United States. As part of an investigation into mimicry in British hoverflies (Howarth, 1998), this paper attempts to match model/mimic pairs in Britain and to investigate their habitat niches so as to establish whether the resemblance really is mimicry, and whether this kind of association played a part in the evolution of the Syrphidae. The objectives of this paper are (a) to identify possible model and mimic groups; (b) to assess whether the syrphids are likely to be genuine examples of Batesian mimicry by comparing flight period and habitat of proposed models and mimics; and (c) to assess whether some syrphids are very precise, specific mimics of particular hymenopterans while others have a more general, less detailed similarity to Hymenoptera.

METHOD

The coloration, shape and size of all British syrphid species was compared with those of Hymenoptera, and a list was compiled of all hoverflies which have been successfully matched to a hymenopteran. These matching pairs (or groups) are possible examples of Batesian mimicry between hoverflies and hymenopteran models. Although some of the Hymenoptera listed do not occur in Britain, they all occur in Europe. These have been included because some of them may have become extinct in Britain, or because some of the Syrphidae may have colonised and become established in the British Isles in the absence of the model. Hoverfly species have been listed in the systematic order used by Stubbs & Falk (1983), including some

subsequent name changes (Kormann, 1988). The matching of syrphid species to hymenopteran species was carried out using specimens in both our personal and museum collections by a syrphid specialist (B.H.) and a hymenopteran specialist (C.C.).

Criteria used

The following criteria were used for every species investigated:

(a) Overall morphological resemblance to Hymenoptera. Does the hoverfly have similar size, shape, hairiness, colour pattern and hue to a hymenopteran?

(b) Specific markings or body shape. Does the hoverfly have very precise similarities to one particular hymenopteran in markings and morphology (e.g. enlarged antennae)?

(c) Behavioural information where available. Does the hoverfly have any behavioural similarities to one particular hymenopteran? For example many parasitic Hymenoptera fly low over the ground searching for a prey species' nest (Richards, 1980), and some syrphids have been observed flying in a similar manner. This criterion only applies to species which have been observed in the field.

If a hoverfly fulfilled criterion (a) that there were overall similarities to a bee or wasp, but did not fulfil criteria (b) or (c), then it was classified as a general or non-specific bee or wasp mimic. If a hoverfly fulfilled criteria (a) and (b) (and perhaps (c) as well if information was available), such that it has a precise resemblance to one particular species (or group of similar species) of bee or wasp, then it was classified as a specific bee or wasp mimic. Thus if a hoverfly was simply striped yellow and black but its markings and shape do not closely resemble one particular solitary or social wasp, then it would be classified as a non-specific wasp mimic under criterion (a). But if a fly was large with similar markings and behaviour to a social wasp, then it would fulfil criteria (b) and (c) and so be classified as a specific mimic of social wasps.

Once a syrphid (or a visually similar group of syrphids) had been matched to a presumed model (Table 1 column "Hoverfly and Proposed Model Species"), flight period, geographical range and status, and adult habitat were compared from records in the literature. This is recorded in Table 1 as columns "Flight Period (Months), Geographical Range/Abundance (status)" and "Habitat and habits (adult)". A further column "Habit (syrphid larvae)" describes larval habit and habitat of all syrphids listed where it is known. Syrphid larval habit/habitat is important as many adult hoverflies do not feed in the same habitat that is used for oviposition and breeding. Behaviour of adult Hymenoptera consists mainly of preparing nest sites for their young, therefore habits/habitats of hymenopteran larvae are not described separately but are included under "Habitat and habits (adult)". The final column, "Plate No./Notes", includes any relevant personal observations and in some cases reference to a colour plate.

The column "Hoverfly and Proposed Model Species" lists a hoverfly species or genus (or a group of hoverflies which are indistinguishable in flight), and below this, separated by a line, is the proposed model species or genus. This is one model/mimic pair or group to which the unique reference number in the first column, "No.", refers. This reference number is also used in the results. Column 3, "Flight Period (Months)", refers to months by number (i.e. January is 1, February 2 etc.). The peak flight period is given in bold font.

Table 1. Fifty-nine possible examples of Batesian mimicry in the British Syrphidae
Each Number gives a model/mimic pair with the mimic(s) first (above the line) and the model(s) second (below the line).
Information from Ball and Morris (in prep.), Chinery (1993, 1986), Else (in prep.), Kormann (1988), Richards (1980), Stubbs and Falk (1983), Yeo and Corbet (1983); other sources credited where appropriate.
Abbreviations in 'Geographical Range/Abundance (Status)': BI British Isles, E England, GB Great Britain, I Ireland, S Scotland, W Wales, s south, w west, n north, e east.
'Flight Period': bv bivoltine; peak season in bold.
'Plate No/Notes': † Carl Clee; *Brigitte Howarth
(for further details of columns see text).

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range/ Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No./ Notes
	SYRPHINAE **BACCHINI** incl. **MELANOSTOMATINI**					
1.	*Baccha elongata* (Fab.), *B. obscuripennis* Meigen	**5–6**, **8–9**–10	BI, common	woodland margins and hedgerows	aphidophagous; associated with ground layer aphids	
	Trypoxylon attenuatum Smith *T. clavicerum* Lep. & S.	5–9	*T. attenuatum* GB, common *T. clavicerum* E, W, common	woodland, nests in cut stems and hollow roots, preys on spiders		
2.	*Melanostoma* spp., *Platycheirus* spp. with yellow markings	4–11	*Melanostoma* spp. BI, common *Platycheirus* spp. BI, common	moist herbage and grassland, scrub and woodland margins	aphidophagous	Plate 1
	Crossocerus quadrimaculatus (Fab.)	6–9	E, W, I, common	wooded areas, varied prey but mainly Diptera, nests in earth particularly amongst roots of uprooted trees		Plate 1

(*continued on next page*)

Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range/ Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No./ Notes
3.	*Pyrophaena granditarsa* (Forster)	5–10	GB, I, common	marshy meadows, lush vegetation by ditches and lakes	aphidophagous	low-flying over vegetation at ground level; Plate 4
	Nomada fabriciana (L.) *Andrena labiata* Fab. *Andrena marginata* Fab.	3–6, 6–8 bv 3–6, 6–8 bv 3–9	BI, common (rare in I) E; locally common scattered throughout GB, rare	calcareous grassland, open grassland, woodland margins		*Sphecodes* and *Nomada* also low-flying; Plate 4
	Sphecodes spinulosus von Hagens	5–6	sE, sW, rare			
	SYRPHINI incl. **CHRYSOTOXINI**					
4.	*Chrysotoxum arcuatum* (L.), *C. cautum* (Harris), *C. elegans* Loew, *C. octomaculatum* Curtis, *C. verralli* Collin	5–9	*C. arcuatum* nGB, I, frequent (local); others sGB, some frequent some rare	lightly wooded areas, moorland margins	myrmecophilous, feeding on root aphids in ant nests (Rotheray *et al.*, 1996)	flies over low vegetation*; Plate 2
	Dolichovespula spp. and *Vespula* spp.	3/4–10	BI, common	various habitats		Plate 2
	Anthidium spp.	5–8	sE, mainly European, common			
5.	*Chrysotoxum bicinctum* (L.)	5–6–9	BI, frequent	grassy areas, meadows with shelter near scrub and trees	myrmecophilous, feeding on root aphids in ant nests (Rotheray *et al.*, 1996)	
	Argogorytes mystaceus (L.)	5–8 (9)	BI, common	variety of habitats, preys on nymphs of *Philaenus* (Aphrophoridae), nests in soil		

(continued on next page)

Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range/ Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No./ Notes
6.	*Chrysotoxum festivum* (L.)	6–**7–8**–10	GB (mainly s), I, never abundant, but frequent in sGB (local)	grassy areas near woodland or scrub margins	myrmecophilous, feeding on root aphids in ant nests (Rotheray *et al.*, 1996)	
	Ectemnius cavifrons (Thompson)	6–10	E, W, I, common	often seen on flowers of umbellifers, preys on Diptera (mainly Syrphidae), nests in rotten wood or plant stems		
7.	*Dasysyrphus tricinctus* (Fallen)	4–**5–6**, **8–9**–10	BI, common	margins of lowland woods	primarily aphidophagous (Rotheray, pers. comm.), but also predatory on tenthredinid (Gäbler, 1939) and noctuid larvae (Friederichs *et al.*, 1940)	Plate 2
	Nysson spinosus (Forster)	5–7	BI, common	associates with *Argogorytes mystaceus* and *A. fargeii*		cleptoparasitic, Plate 2
8.	*Doros profuges* (Harris) (= *conopseus* Fab.) (Rab.)	**6**–7	GB, rare, vulnerable (scattered distribution) (Falk, 1991)	has been seen near or resting on bramble	unknown, ant association suggested (Lundbeck, 1916)	Plate 2
	Odynerus spp.	5–8/9	BI, rare	nests in soil or vertical sand faces		Plate 2
	Ancistrocerus antilope (Panzer)	6–8	GB, irregular not often common	nests in a variety of cavities		
9.	*Episyrphus balteatus* (Degeer)	1–**7–9**–12	BI, common	varied habitats	polyphagous on ground layer and arboreal aphids	
	Nomada spp.	3–8	BI, common but some rare	varied habitats		

(continued on next page)

Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range/ Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No./ Notes
10.	*Eriozona syrphoides* (Fallén)	5, 7–**8–9**–10, bv	GB, local	spruce plantations, deciduous woods containing spruce	aphidophagous on conifer aphids (Kula, 1983)	prefers mauve flowers
	Bombus pratorum (L.)	2–9	BI, common	meadow, woodland margins		
	Bombus sylvarum (L.)	5–9	GB (mainly s), I, rare	woodland, calcareous grassland, heathland, coastal shingle		
	Bombus terrestris (L.)	2–10	BI, common	various habitats		
11.	*Melangyna* spp. incl. *Meligramma* and *Meliscaeva* spp.	3–10	BI, common as a group	woodland, high in canopy on sallow blossom, hazel catkins, also on ground flowers	aphidophagous, associated mainly with arboreal aphids (Rotheray, 1993)	no plate, but similar to no. 2
	Crossocerus quadrimaculatus (Fab.)	6–9	E, W, I, common	see 2		
12.	*Scaeva pyrastri* (L.)	5–**7–8**–11	BI, frequent but fluctuates (migrant)	meadows, gardens, waste ground	aphidophagous, primarily associated with ground layer aphids (Rotheray, 1993)	Plate 3
	Bembix rostrata (L.)	6–8	European species	European species, preys on Diptera		Plate 3
13.	*Sphaerophoria* spp.	4–10	BI, common as a group	dry grassland, woodland rides or marshes	aphidophagous on ground layer aphids (Rotheray, 1993)	
	Cerceris quinquefasciata (Rossius)	7–8	sE, rare	nests in sand, preys on Coleoptera		
	Crossocerus quadrimaculatus (Fab.)	6–9	E, W, I, common	see 2		
	European *Ectemnius*	6–8	European spp.	ground, plant stems and rotten wood nesting		

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Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range/ Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No./ Notes
14.	*Syrphus* spp.	3–11	BI, common	various habitat areas	aphidophagous (Rotheray, 1993)	
	Dolichovespula spp. and *Vespula* spp.	3/4–10	BI, common	various habitats		
15.	*Xanthogramma citrofasciatum* (Degeer)	**4–5–early 7**	E (mainly s), scarce (local)	meadows, dry grassland	myrmecophilous, feeding on root aphids in ant nests (Rotheray *et al.*, 1996)	hovers low over ground;* Plate 4
	Nomada goodeniana (Kirby)	4–7, 7–8, bv	BI, common (rare in I and S)	hedge and ditch banks, usually dry ground		*Ectemnius* spp. prey on syrphids; Plate 4
	Nomada marshamella (Kirby)	4–6, 6–9, bv	BI, common	as above		
	Nomada fulvicornis Fab.	3–6, 6–8, bv	GB (mainly sE), rare	as above		
	Ectemnius spp.	5–10	BI, some common, some rare	nests in rotten wood on plant stems		
16.	*Xanthogramma pedissequum* (Harris)	5–**6–8**–9	E, W, scarce (mainly s) (local)	grassland and open woodland rides	myrmecophilous, feeding on root aphids in ant nests (Rotheray *et al.*, 1996)	hovers low over ground;* Plate 4
	Crabro cribrarius (L.)	5–9	BI, common	nests in soil, preys on Diptera incl. syrphids		Plate 4
	Ectemnius spp.	5–10	see no. 15	see 6		
	Nomada spp.	4–9	see no. 15	varied habitat		

(continued on next page)

Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range/ Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No./ Notes
	MILESIINAE					
	CALLICERINI					
17.	*Calicera aenea* (F.), *C. rufa* Schummel, *C. spinolae* Rondani	6–10	*C. aenea* sE, rare *C. rufa* S, rare *C. spinolae* sE, endangered (Falk, 1991)	found in ancient pine woods known from East Anglia	saprophagous, larvae in this genus found in rot-holes (Rotheray, 1993)	Plate 3
	Osmia spp.	4–8	BI, frequent	burrows in soil, cavities in dead wood or snail shells		Plate 3
	Anthophora spp.	6–9	BI, frequent	burrows in level soil, sandy banks, cliff faces, lowland heaths and coastal dunes		
	Eucera longicornis (L.)	4–7	E, W locally common	flower-rich sandy habitats		
	CHEILOSIINI					
18.	*Cheilosia albipila* Meigen	3–**4**–6	BI, frequent (local)	sallow, hazel catkins, ferns, marshes, wet meadows	phytophagous on *Cirsium palustre* stems (Andrewes, 1944, and Rotheray, 1988)	fly and bee seen together on sallow†
	Andrena apicata Smith	3–5	BI, frequent (common in s)	open woodland, heaths, moorland and abandoned sand and chalk quarries; sallow specialist		
19.	*Cheilosia chrysocoma* (Meigen)	3–**5**–6	GB, I, S, W, rare	woodland rides, glades, and edges, close to marshy areas	phytophagous, plant unknown (Stubbs and Falk, 1983)	Plate 3
	Andrena fulva Müller	3–6	BI, common (mainly E, W)	level ground with short grass		nests in coastal clay cliffs†; Plate 3
	Osmia rufa (L.)	4–5/6/7	GB, common	cavities in sandy soils, dead wood, crevices		

(continued on next page)

Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range/ Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No./ Notes
20.	*Cheilosia grossa* (Fallén)	3 **late 3–4** 5	BI, scarce (local)	woodland rides, glades and edges, grazing marshes, wet meadows. On sallow and hazel	phytophagous on *Cirsium palustre*, *C. vulgaris* and *Carduus tenuiflorus* in stem and root (Rotheray, 1993)	
	Andrena nigroaenea (Kirby)	3 5 6, 7 8	BI, common	frequents sallow and dandelion, nests in sandy loamy soil		
21.	*Cheilosia impressa* Loew, *C. mutabilis* (Fallén), *C. nebulosa* Verrall, *C. pagana* (Meigen), *C. vernalis* (Fallén)	3–9	*C. pagana* and *C. vernalis* BI, common, others rare	varies from damp woods to open grassland, usually on low flowers and umbellifers	phytophagous (Rotheray, 1993)	small black or brown
	Lasioglossum albipes (Fab.), *L. fratellum* (Perez)	4–10	BI, common			small black or brown
22.	*Cheilosia illustrata* (Harris)	4 **7–8**–9	BI, common	woodland, woodland margins, umbellifers	phytophagous on *Heracleum sphondylium* and *Angelica sylvestris* (Stubbs and Falk, 1983)	general bumble bee mimic*
	Andrena cineraria (L.)	3 6	BI, common, scarce in seE, S	pasture land, woodland, chalk grassland and coastal sites		
	Bombus pratorum (L.)	2–9	BI, common	see 10		
23.	*Ferdinandea cuprea* (Scopoli)	4 **5–6** 10	BI, frequent (local)	woodland, tree trunks or dead leaves in dappled light	saprophagous, found in sap-runs on deciduous trees (Rotheray, 1993)	
	Andrena apicata Smith	3–4, also 5	BI, frequent (common in s)	see 18		
	Osmia rufa (L.)	4 7	GB, common	see 17 and 19		

(*continued on next page*)

Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range/ Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No./ Notes
24.	*Rhingia campestris* Meigen	4–**5–6**+**9**–11,	BI, common	open woodland, woodland edges, hedgerows	saprophagous, in cow dung (Coe, 1942)	
	Andrena marginata Fab.	3–9	scattered throughout GB, rare	see 3.		
	Sphecodes gibbus (L.)	4–9	GB, common	light sandy soils, woodland edges		
	CHRYSOGASTRINI					
25.	*Neoascia geniculata* (Meigen), *N. interrupta* (Meigen), *N. meticulosa* (Scopoli), *N. obliqua* Coe, *N. podagrica* (F.), *N. tenur* (Harris)	4–**5–6**+**7–9**–11	BI, common as a group, some are rare	near marshes, water edges, hedgerows, woodland margins	saprophagous, found in decaying vegetation round the margins of ponds (Rotheray, 1993)	
	Stigmus solskyi Morawitz	6–8	E, W, scarce	in small beetle holes in wood and cut stems		*S. solskyi* varies in size
	Crossocerus megacephalus (Rossius), *C. ovalis* Lepeletier & Brulle, *C. elongatulus* (Vander Linden), *C. wesmaeli* (Vander Linden)	5–9	BI, common	wooded areas, varied prey but mainly Diptera, nests in earth particularly amongst roots of uprooted trees		
26.	*Sphegina clunipes* (Fallén), *S. kimakowiczi* Strobl, *S. verecunda* Collin	**5–7**–10	BI, frequent (*S. clunipes*) (local)	deciduous woodland with lush herb layer, damp shady woodland	saprophagous, in decaying sap under bark, usually in wet situations (Rotheray, 1993)	
	Pemphredon inornata Say	5–9	BI, common	woodland, nests in stems		
	Pemphredon lethifera (Shuckard)	5–10	BI, common	woodland, nests in cut stems, usually *Rubus*		
	Psenulus pallipes (Panzer)	5–8	E, W, I, common	nests in stems, straw, beetle holes in wood, preys on aphids		

(continued on next page)

Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No./ Notes
	ERISTALINI					
27.	*Anasimyia contracta* Claussen & Torp, *A. transfuga* (L.)	5 **6–7** 8	sE, W, I, S, frequent but local	margins of ditches, ponds and lakes	rat-tailed larva, in pools/ponds with *Typha* and decaying vegetation (Rotheray, 1993)	
	Epeolus variegatus (L.)	6–8	GB (mainly s), locally common	open woodland, coastal dunes		
	Epeolus cruciger (L.)	6–9	GB (mainly s), locally common	heathland and coastal dunes		
28.	*Anasimyia lineata* (Fab.)	5 **6–7** 9	BI, frequent but local	bogs	rat-tailed larva, as 27	
	Coelioxys inermis (Kirby)	5–8	sE, W, locally common	cleptoparasitic on *Megachile* and *Anthophora*, found near sand dunes		
29.	*Eristalis arbustorum* (L.)	4 **7–9** 11	BI, common	open habitats, woodland and field margins	rat-tailed larva in farmyard drains, and decaying vegetation (Rotheray, 1993)	Plate 4
	Apis mellifera L.	3–10/11	BI, common	various habitats		Plate 4
	Andrena flavipes Panzer	3–6, 6–9, bv	GB (mainly s), frequent	open woodland, chalk grassland, coastal landslips		
	Stelis punctulatissima (Kirby)	5–8	sGB, rare	dead wood, beetle holes, cuckoo of *Osmia* spp.		
30.	*Eristalis intricarius* (L.)	3 **7–8** 10	BI, common	flowers, marshy woodland and margins	saprophagous, as 29	Plate 5
	Bombus terrestris (L.)	2–10	BI, common	various habitats		Plate 5
	Bombus pratorum (L.)	2–9	BI, common	see 10		

(*continued on next page*)

Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range/ Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No./ Notes
31.	*Eristalis pertinax* (Scopoli), *E. rupium* Fab., *E. tenax* (L.)	1–12	BI, common	various habitats	saprophagous, as 29	
	Apis mellifera L.	3–10/11	BI, common	various habitats		
32.	*Helophilus* spp.	4–11	BI, common	pond or ditch margins, muddy puddles, meadows. At flowers	saprophagous, as 29	
	Dolichovespula spp. and *Vespula* spp.	3/4–10	BI, common	various habitats		
33.	*Lejops vittata* (Meigen)	5–**7–8**–9	sE, rare, vulnerable (Falk, 1991)	coastal and other marshes	long-tailed larva (Rotheray, pers. comm.), not described	low flight; Plate 3
	Coelioxys inermis (Kirby) and other *Coelioxys* spp.	5–8	sE, W, locally common	cleptoparasitic on *Megachile* and *Anthophora*, found near sand dunes		low flight over ground; Plate 3
34.	*Mallota cimbiciformis* (Fallén)	5–**6–8**–9	E, rare, notable (Falk, 1991)	forests, parks	saprophagous, in rot holes in trees (Rotheray, 1993)	Plate 1
	Apis mellifera L.	3–10/11	BI, common	see 31		Plate 1
35.	*Myathropa florea* (L.)	5–10	BI, common	wooded areas	saprophagous, as 34	
	Dolichovespula spp. and *Vespula* spp.	3/4–10	BI, common	various habitats		
36.	*Parhelophilus frutetorum* (Fab.)	5–**6–7**–8	sGB, locally frequent	open pond sites and ditches with *Typha*	saprophagous, associated with accumulations of decaying vegetation (Rotheray, 1993)	Plate 2
	Vespula rufa (L.)	2–**4–6**–10	BI, common	subterranean nests, found widely distributed		Plate 2

(continued on next page)

Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No./ Notes
	MERODONTINI					
37.	*Eumerus sabulonum* (Fallén)	5 **6** 9	wE, wS, wW, rare, notable (Falk, 1991)	sand dunes and earthy coastal cliffs	probably feed on fungal breakdown products within pockets of decay in live or recently dead herbaceous plants (Rotheray, 1993)	
	Xylota dimidiata Jurine	6–9	E, W, scarce	cleptoparasitic on *Gorytes tumidus* or *Lindenius albilabris*		this could be aggressive mimicry*; Plate 5
	Gorytes tumidus (Panzer)	6–9	BI, scarce	nests in sand, preys on Hemiptera		
38.	*Eumerus strigatus* (Fallén), *E. tuberculatus* Rondani	3–**4–5**+ **8–9**–10	BI, common	various habitats	phytophagous on plant bulbs, with fungal decay present (Creager and Spruijt, 1935)	Plate 5
	Osmia caerulescens (L.)	4–8	E, W, common	various habitats		Plate 5
	Hoplitis claviventris (Thomson)	5–8	E, W, frequent, locally common	calcareous grassland, open woodland, dunes		
	Stelis ornatula (Klug)	5–8	E, as far n as Midlands	dead wood, beetle holes		
39.	*Merodon equestris* (Fab.)	4 **late 5–6**–8	BI, locally common	woodland with *Narcissus* bulbs	phytophagous on bulbs of *Narcissus* flowers (Hodson, 1932)	polymorphic, many forms
	Bombus terrestris (L.), *B. lucorum* (L.), *B. muscorum* (L.), *B. pascuorum* (Scopoli), *B. ruderarius* (Müller)	2–11	BI, common	various habitats		

(*continued on next page*)

Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range/ Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No./ Notes
	SERICOMYIINI					
40.	*Arctophila superbiens* (Müller) (= *A. fulva*)	7–**8–9**–11	BI, frequent but local (mainly n + w)	woodland margins, meadows with *Succisa* flowers	saprophagous; wet decaying vegetation on moorlands (Rotheray, pers. comm.)	
	Bombus muscorum (L.), *B. pascuorum* (Scopoli)	4–**7–9**–10	BI, common	various habitats		
41.	*Sericomyia lappona* (L.)	4–8	BI, local	boggy localities, woodland margins with river nearby, boggy meadows	saprophagous; wet decaying vegetation on moorlands (Rotheray, 1993)	Plate 4
	Anthophora quadrimaculata (Panzer)	6–8	sE, scarce but locally common	rural and urban areas, sandy banks and cliffs		Plate 4
	Andrena flavipes Panzer	3–5, 6–9, bv	GB (mainly s), frequent	see 29		
	Andrena labialis (Kirby)	5–8	E, sW, frequent	deciduous woodland, fenland, grasslands		
42.	*Sericomyia silentis* (Harris)	5–9	BI, common	boggy heaths, acid wet meadows or woodland clearings/ margins	saprophagous; wet decaying vegetation on moorlands (Rotheray, 1993)	
	Dolichovespula and *Vespula* spp.	3/4–10	BI, common	various habitats		

(continued on next page)

Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range/ Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No./ Notes
	VOLUCELLINI					
43.	*Volucella bombylans* (L.)	5–**6**–8	BI, common	woodlands and meadows with woodland nearby	found in vespine nests, thought to feed on debris, possibly predatory on host larvae (Rotheray, 1993)	polymorphic, with three forms; Plate 5
	Bombus lapidarius (L.), *B. lucorum* (L.), *B. ruderarius* (Müller), *B. terrestris* (L.) and possibly *B. pascuorum* (Scopoli) (pale variety)	2–11	BI, frequent as a group	various habitats		Plate 5
44.	*Volucella inanis* (L.)	7–**8**–10	sE, frequent, notable (Falk, 1991)	on Continent in woodland and margins	ectoparasite of vespine larvae (Rupp, 1989)	recent colonist
	Vespula spp. *Vespa crabro* L.	3/4–10 5–9	BI, common sE, locally common	various habitats nests in hollow trees, food includes nectar, fruit, insects		
45.	*Volucella zonaria* (Poda)	6–**8**–10	sE, frequent, notable (Falk, 1991)	on Continent near woodland meadows and margins	found in vespine nests, may feed on debris or predatory on host larvae (Rotheray, 1993)	recent colonist
	Vespa crabro L.	5–9	sE, locally common	see 44		

(continued on next page)

Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range/ Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No./ Notes
	XYLOTINI					
46.	*Blera fallax* (L.)	6–8	S, rare, endangered (Falk, 1991)	pine forests of the eastern Highlands, Scotland	found in rot-holes of *Pinus* (Rotheray and Stuke, 1998)	Plate 5
	Osmia bicolor (Schrank)	4–7	sE, W, scarce	calcareous grassland, also open woodland (southern species), nesting in snail shells		Plate 5
	Osmia aurulenta Fab.	4–8	BI, locally common in s	coastal, inland confined to calcareous grassland, nesting in snail shells		
47.	*Brachypalpoides lenta* (Meigen)	**5–6**–8	E, W, S, I, scarce (local)	forested districts	saprophagous, decaying heartwood of *Fagus* (Rotheray, 1993), and other trees (Rotheray, pers. comm.)	resembles a saw-fly*, Plate 1
	Astata boops (Schrank)	6–8	seE, common	dry sandy banks and habitats, sometimes on umbellifers		Plate 1
48.	*Brachypalpus laphriformis* (Fallén)	4–**5–6**–8	E, S, W, rare	ancient woodland/woodland margins	saprophagous, in rot-holes of deciduous trees (*Quercus*) (Rotheray, 1993)	Plate 1
	Colletes spp.	6–10	BI, common	various habitats, also open woodland		
	Apis mellifera L.	3–10/11	BI, common	various habitats		Plate 1

(continued on next page)

Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No. Notes
49.	*Caliprobola speciosa* (Rossi)	5–6–7	sE, rare, notable (Falk, 1991)	deciduous woodland	saprophagous, in decaying heartwood of *Fagus* trees, particularly old stumps (Rotheray, 1993)	
	Dolichovespula sylvestris (Scopoli), *D. media* (Retzius)	3–9	BI, common	nests underground but also in ivy, hollow trees, beehives, trees or bushes		
50.	*Chalcosyrphus* (*Xylotina*) *nemorum* (Fab.)	4–5–7–9	BI, scarce (can be common in s) (local)	ancient woodland	saprophagous; under bark in decaying sap (Rotheray, 1993)	
	Crabro scutellatus (Scheven)	6–8	E, frequent but local	in soil and preys on Diptera		
	Ectemnius continuus (Fab.)	5–9	BI, common	in rotten wood, plant stems, prey as above		
51.	*Chalcosyrphus* (*Xylotodes*) *eunotus* (Loew)	4–6–7	E, W, rare, vulnerable (Falk, 1991)	woodland/shaded situation by water	saprophagous, see previous species	
	Colletes spp.	6–10	BI, common	see 48		no plate but pair like no. 48
	Apis mellifera L.	3–10/11	BI, common	various habitats		
52.	*Criorhina asilica* (Fallèn)	4–5–7	E, scarce, notable (Falk, 1991)	ancient woodland/woodland margins	saprophagous, decaying heartwood, old stumps and rot-holes (Rotheray, 1993)	Plate 1
	Apis mellifera L.	3–10/11	BI, common	various habitats		Plate 1

(*continued on next page*)

Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range/ Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No./ Notes
53.	*Criorhina berberina* (F.)	4–**5**–**6**–8	E, I, W, S, frequent (local)	ancient woodland/woodland margins	saprophagous, as 52	
	Bombus pascuorum (Scopoli), *B. pratorum* (L.), *B. terrestris* (L.)	2–11	BI, common	various habitats		
54.	*Criorhina floccosa* (Meigen)	4–**5**–**6**–7	BI, scarce (local)	ancient woodland/woodland margins	saprophagous, as 52	
	Bombus muscorum (L.), *B. pascuorum* (Scopoli)	3–11	BI, common	various habitats		
55.	*Criorhina ranunculi* (Panzer)	**3**–**5**–6	BI, scarce, notable (Falk, 1991)	ancient woodland/woodland margins, often found feeding on *Salix* spp.	saprophagous, as 52	Plate 5
	Bombus lapidarius (L.), *B. lucorum* (L.), *B. ruderarius* (Müller), *B. terrestris* (L.)	2–10	BI, common	various habitats		Plate 5
56.	*Pocota personata* (Harris)	4–**6**–7	E, scarce, vulnerable (Falk, 1991)	mostly a southern species	saprophagous, breeds in rot-holes (Rotheray, 1993)	Plate 5
	Bombus terrestris (L.)	2–10	BI, common	various habitats		Plate 5
57.	*Syritta pipiens* (L.)	4–**7**–**9**–10	BI, common	rough meadows, hedgerows, marshy areas	saprophagous, in wet, decaying matter incl. compost, manure, silage (Rotheray, 1993)	
	Crossocerus quadrimaculatus (Fab.)	6–9	E, W, I, common	see 2		

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Table 1. *(continued)*

No.	Hoverfly and Proposed Model Species	Flight Period (Months)	Geographical Range Abundance (status)	Habitat and habits (adult)	Habit (syrphid larvae)	Plate No., Notes
58.	*Tropidia scita* (Harris)	4–6–7–9	E, S, I, frequent, locally abundant	open fens and lush marshes	saprophagous, decaying vegetation, mud margins (Decleer and Rotheray, 1990)	
	Nomada ruficornis (L.)	4–6	BI, common	various habitat areas		
	V. fabriciana (L.)	3–8, bv	BI, common	woodland, heaths, coast, moors, meadows		
	V. flava Panzer	4–6	sE, common	hedgebanks, ditches		
	MICRODONTINAE					
59.	*Microdon mutabilis* (L.)	5–6–7	BI, rare, notable (Falk, 1991)	grassy limestone slopes/ woodlands/wood margins, wet meadows, dune slacks	predaceous on ant larvae (Barr, pers. comm.)	
	Anthophora furcata (Panzer)	5–9	E, S, common	various habitat areas		
	Andrena chrysosceles (Kirby)	3–6/7	E, W, common	particularly associated with woodland		

Results

The results of the evaluation are presented in Table 1. All model/mimic pairs or groups are regarded as prime candidates for more detailed investigation to determine whether the resemblance really is Batesian mimicry. For some model/mimic pairs there is much information additional to that given in Table 1, and these are discussed below. They are arranged according to the conclusions reached in the sequence social wasp mimics, solitary wasp mimics, bumble bee mimics, solitary bee mimics, hive bee mimics.

Social wasp mimics

Pair No. 4. *Chrysotoxum arcuatum*, *C. cautum*, *C. elegans*, *C. octomaculatum* and *C. verralli* compared with *Dolichovespula* spp. and *Vespula* spp. (Plate 2).

Chrysotoxum arcuatum and *C. cautum* are the most commonly seen hoverflies of this group; they very closely resemble social wasps behaviourally and morphologically, with elongated antennae and colour patterns which are very wasp-like (e.g. Stubbs & Falk, 1983). The social wasps comprise *Vespula austriaca* (Panzer), *V. germanica* (F.), *V. rufa* (L.), *V. vulgaris* (L.), *Dolichovespula norwegica* (F.), and *D. sylvestris* (Scopoli). *Vespula austriaca* is a rare species which is a parasite in the nests of *Vespula rufa* (Chinery, 1986), but the other wasp species are all common and widespread. *Vespula* nest sites are usually subterranean whereas those of *Dolichovespula* are usually suspended from branches of trees or shrubs, or in hollow trees (Richards, 1980).

The flight of *Chrysotoxum* is similar to that of a wasp, and generally the only time it can be identified as not being a wasp is when it rests on vegetation (B.H., M.E. pers. observations). The flies are also found in the same habitat (see Table 1) and hence members of this group would seem to be Batesian mimics. The distribution of the two commoner species of this mimic group supports this view. *C. arcuatum* occurs north and west of a line from the Severn to the Humber, whereas *C. cautum* occurs south and east of this line (Stubbs & Falk, 1983; Ball & Morris, in preparation). Both species occupy the same flight season of May to September. Being allopatric means they will avoid being in competition with each other, but also means it is unlikely that the mimics will outnumber the models.

The hoverflies in this group vary in size, and another possible model species has been postulated for the smaller *C. arcuatum* (Table 1). *Anthidium* spp. are round and compact insects, a feature also shared by the hoverfly. There may be Müllerian mimicry between the social wasps and the bees from which the hoverfly would also benefit. However, *Anthidium* is not common in the north of Britain where *C. arcuatum* is widespread, but it is a possible model on continental Europe.

The hoverflies in this mimicry group have been classified in accordance with criteria (a), (b) and (c) as specific Batesian mimics of social wasps.

Pair No. 9. *Episyrphus balteatus* compared with *Nomada* spp.

Both species have slender bodies with yellow or orange and black markings, but although some *Nomada* spp. have a 'common' status, they never reach anything like the abundance of *E. balteatus*, which is often the commonest syrphid in mid and late summer. Although *E. balteatus* and *Nomada* are similar in size, colour and hovering behaviour, their detailed colour pattern is different, and they hover in different

Plate 1 Top row: *Melanostoma mellinum*, *Crossocerus quadrimaculatus*; second row: *Brachypalpus laphriformis*, *Apis mellifera*; third row: *Mallota cimbaciformis*, *Criorhina asilica*; bottom row: *Brachypalpoides lenta*, *Astata boops*. Species in each row are to the same scale.

places. *Nomada* spp. are normally seen hovering low over the ground searching for prey species' nests, whereas *E. balteatus* is most often seen hovering near flowers or trees. Instead this hoverfly may benefit from a general resemblance to yellow and black social and solitary wasps, especially when it hovers and the details of its abdominal pattern are blurred. Although to human eyes *E. balteatus* appears rather unlike a wasp in colour and behaviour, to some birds the resemblance to wasps is very close (Dittrich *et al.*, 1993). It was therefore classified according to criterion (a) as a non-specific Batesian mimic of yellow and black solitary and social Hymenoptera.

Pair No. 14. *Syrphus* spp. compared with *Dolichovespula* spp. and *Vespula* spp.

The proposed mimics in this group include *Syrphus ribesii* (L.), *S. vitripennis* Meigen, *S. torvus* Osten-Sacken and various species of *Epistrophe*, *Parasyrphus* and *Metasyrphus*. All have yellow spots or bands across the otherwise black abdomen and so have some similarity to social wasps; but the size, shape and behaviour of the flies is so different to that of wasps that they were not initially included in Table 1 at all. However, they have wasp-like colours, and they are often the commonest hoverflies present, so it seems likely that they must gain some protection from their colour pattern. The hoverflies in this group have therefore been classified following criterion (a) as non-specific Batesian mimics of social wasps.

Pair No. 17. *Callicera aenea*, *C. rufa* and *C. spinolae* compared with *Osmia* spp., *Anthophora* spp. and *Eucera longicornis* (Plate 3).

Pinned specimens of these species of *Callicera* closely resemble the proposed models with similar shape, hairy bodies, and antennae. However, G. Rotheray (pers. comm.) has observed *C. spinolae* in the field. He reports that it is very like *Vespula* in flight and colour pattern, and flies with *Vespula* when feeding on ivy flowers. It has yellow bars across the abdomen which are very similar to those on *Vespula* when walking over flowers. It also folds its wings over the abdomen and even flicks them like a wasp. Finally its peak flight month is September when wasps are at their most abundant. *Callicera spinolae* has therefore been classified as a specific mimic of social wasps in accordance with criteria (a), (b) and (c). For the other species of *Callicera* further field observations are obviously required.

Pair No. 32. *Helophilus hybridus* Loew, *H. pendulus* (L.), *H. groenlandicus* (F.) and *H. trivittatus* (F.) mimicking *Dolichovespula* spp. and *Vespula* spp.

Helophilus spp. group comprises four hoverfly species which all resemble one another closely. Two of these, *H. hybridus* and *H. pendulus*, are common and widespread in a variety of habitats. To the human eye *Helophilus* spp. are poor mimics; when at rest the yellow and black colours are clearly visible, but the patterns are quite different from those of the suggested model species. *Helophilus* spp. also vary in size and do not display distinctive wasp-like morphological features such as long antennae.

Both *Helophilus* spp. and social wasps are very common throughout the British Isles (Chinery, 1986). *Helophilus* spp. are usually seen on flowers, or resting on ground vegetation. Social wasps occupy the same habitat niche with foraging trips including visits to flowers either for nectar or to find prey. Although *Helophilus* spp. have different markings to social wasps, their behaviour makes them appear much better mimics to the human eye. When disturbed from ground vegetation *Helophilus*

spp. fly forwards, sidewards, or upwards with 'jerky' movements (B. H. pers. observation). This 'distorts' their bold black and yellow colour patterns and the resemblance to a wasp is much more striking. Thus they appear most wasp-like when disturbed, perhaps by a predator, which is precisely when they are most in need of protection.

The *Helophilus* spp. group was classified according to criterion (a) as a non-specific Batesian mimic of social wasps because its black and yellow colour pattern is quite different from that of the model, but the flies probably gain some protection from resembling social wasps when in flight. This protection may be against insectivorous birds which have learned to avoid wasps, or alternatively, it might be against insectivorous insects such as social wasps where this behaviour and colour pattern may be a way of deceiving the wasp by imitating it.

Pair No. 42. *Sericomyia silentis* compared with *Dolichovespula* spp. and *Vespula* spp.

Sericomyia silentis is one of the larger hoverflies found in Britain. It is common and widespread, as is the model group (see pair No. 4, above, for notes of the model), and often found feeding on flowers in apparently unsuitable breeding habitats. When resting on a flower this hoverfly looks remarkably wasp-like with similar yellow and black markings on the abdomen which appears to be curved down (like that of a wasp) exposing yellow bands between the tergites, and the wings are dark and give the illusion of being folded (again like those of a wasp). It is larger than most other yellow and black syrphids, and its behaviour in flight is also similar to that of social wasps. In southern England and mainland Europe there are other social wasp mimics which are of similar size and even closer in appearance to social wasps (e.g. *Volucella inanis*), but in the rest of Britain this is the largest presumed social wasp mimic. *S. silentis* is most abundant from July till September which is also a time when social wasps are seen in large numbers, especially towards the end of the colony life. This hoverfly has been classified in accordance with criteria (a), (b) and (c) as a specific Batesian mimic.

Solitary wasp mimics

Pair No. 1. *Baccha elongata* and *B. obscuripennis* compared with *Trypoxylon attenuatum* and *T. clavicerum*.

The proposed mimics are very slender, long-bodied flies which are often quite difficult to see (B.H. pers. observations). They are mainly found in woodlands and woodland margins, *B. obscuripennis* being the more common of the two (Stubbs & Falk, 1983). They can easily be mistaken for small wasps until inspected more closely. *Baccha* does not have long antennae, but it does have a very narrow waist typical of Hymenoptera. The proposed models are very similar morphologically and occur in the same habitat as the mimics (see Table 1). They also have similar distributions although the model is more commonly seen. These hoverflies have been classified in accordance with criteria (a), (b) and (c) as specific Batesian mimics.

Pair No. 2. *Melanostoma* spp. and *Platycheirus* spp. with yellow markings (also including *Melangyna lasiophthalma*) compared with *Crossocerus quadrimaculatus* (Plate 1).

This mimic group includes thirteen morphologically very similar hoverfly species: *Melanostoma mellinum* (L.), *M. scalare* (Fab.), *Melangyna lasiophthalma* (Zetterstedt),

Plate 2 Top row: *Chrysotoxum arcuatum*, *Dolichovespula sylvestris*, *Anthidium* sp.; second row: *Parhelophilus frutetorum*, *Chrysotoxum cautum*, *Vespula rufa*; third row: *Dasysyrphus tricinctus*, *Nysson spinosus*; bottom row: *Doros profuges*, *Odynerus* sp.

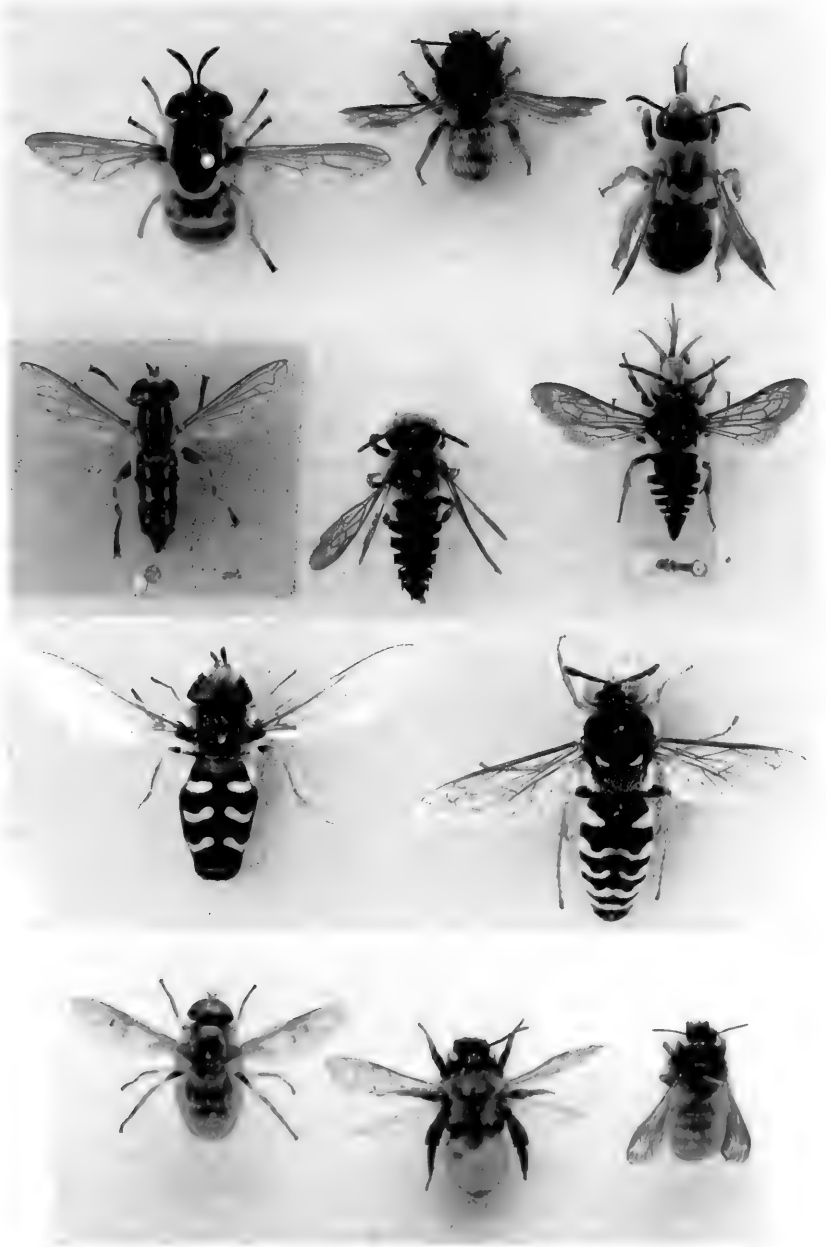

Plate 3 Top row: *Callicera spinolae*, *Osmia rufa*, *Eucera longicornis*; second row: *Lejops vittata*, *Cochioxys conoidea*, *Cochioxys* sp.; third row: *Scaeva pyrastri*, *Bembix rostrata*; bottom row: *Cheilosia chrysocoma*, *Andrena fulva*, *Osmia rufa*

Platycheirus angustatus (Zetterstedt), *P. clypeatus* (Meigen), *P. fulviventris* (Macquart), *P. immarginatus* (Zetterstedt), *P. manicatus* (Meigen), *P. peltatus* (Meigen), *P. perpallidus* Verrall, *P. scambus* (Staeger), *P. scutatus* (Meigen) and *P. tarsalis* (Schummel). All are small slender hoverflies, black with yellow markings, which generally hover in woodland clearings, open grassland, marshes and moist grassland, and near flowers (Stubbs & Falk, 1983). Seven of these are common and widespread throughout much of the British Isles, two are southern species, one a northern species (Ball & Morris, in preparation), and three are considered scarce or rare. Such a large mimic group displays some variation in colour pattern, although on the wing they all look much the same (B.H., M.E. pers. observations). Most have a long flight period with only two species that show distinctive short seasons. In summary, this is a common group to be found in almost any type of habitat, sometimes congregating in large numbers, e.g. 50–100 (B.H. pers. observations), especially those species which are found in woodland margins.

Crossocerus quadrimaculatus is also common (although not as common as the hoverflies) and is small, with variable yellow markings (Richards, 1980). It is often seen amongst Diptera as it preys on them (Richards, 1980). The flies frequently hover between one and two metres in the air whereas *Crossocerus* is usually observed nearer the ground near its nest site.

The proposed model occurs mainly during June to August whereas the mimic group usually occurs from April to November, although it peaks from June to August. It is possible that predation is most prevalent during the peak months (this is when newly fledged birds are beginning to catch their own food), and therefore protection is gained at the time when the model is also on the wing. Alternatively, this mimic group has the ability of fast agile flight and therefore might not be as available to predators as alternative slower prey; its black and yellow coloration might then warn predatory birds that there would be no reward from pursuing such agile prey (Lindroth, 1971; Gibson, 1974, 1980).

We conclude that this group has a general resemblance to the proposed model (criterion (a)), but lacks the detailed morphological and behavioural similarities of criteria (b) and (c). It is therefore classified as a non-specific solitary wasp mimic.

Bumble bee mimics

Pair No. 22. *Cheilosia illustrata* compared with *Andrena cineraria* and *Bombus pratorum*.

Cheilosia illustrata is a furry (densely hairy) fly with distinctive bands of white/buff and black on its thorax and abdomen, and with an orange tail. However, it varies in size and intensity of hue. In flight this species resembles the presumed models quite closely until it comes to rest (B.H., M.E. pers. observations). Unlike its proposed hymenopteran models, it spends much time sitting on umbel flowers feeding, but can also be found together with its models on blackthorn (*Prunus spinosa*) in April.

A. cineraria is a widely distributed Palaearctic species generally found throughout much of the British Isles (Else, in preparation), and is similar morphologically to *C. illustrata*. It can be found in a variety of habitats including pastureland, woodland, and chalk grassland, feeding on a variety of plants, including *Heracleum sphondylium* which is much visited by *C. illustrata* (Stubbs and Falk, 1983). *B. pratorum* occurs in the same habitat as the fly and includes workers which are as small as *C. illustrata*. Both species have an orange tail, furry body, and similar flight, but the detailed colour pattern is different. To the human eye *C. illustrata* does resemble a bumble bee,

particularly *B. pratorum*, although it can be mistaken for a small specimen of *B. terrestris*, particularly if the orange of the tail has faded. This indicates that *C. illustrata* may gain protection from generally resembling a furry solitary or social bee, and hence can be regarded as a non-specific Batesian mimic. In addition, its flight period coincides with that of the suggested models, peaking in abundance when both models are present (Howarth, 1998). This hoverfly has therefore been classified according to criterion (a) as a non-specific Batesian mimic.

Pair No. 30. *Eristalis intricarius* males compared with *Bombus pratorum*; females compared with *Bombus terrestris* and *B. lucorum*, and also with *B. lapidarius* and *B. ruderarius* (Plate 5).

Eristalis intricarius is sexually dimorphic and furry, with females appearing to our eyes much more like bumble bees than males. The males are generally black and orange possibly resembling workers of *Bombus pratorum*. The abdominal terga are usually dark but can have orange markings which are covered with hairs. Heal (1979) reports that some males fit the description of females, but we have not observed these in Lancashire. Males spend much time hovering when the orange hairs are particularly conspicuous. The males were classified in accordance with criterion (a) as non-specific Batesian mimics.

Eristalis intricarius females can occur in two forms, a black morph with a red tail, presumably mimicking *Bombus lapidarius* and *B. ruderarius*, and a black, yellow and white morph closely resembling *B. terrestris* and *B. lucorum* workers with an equally densely hairy body, similar markings, and similar body size. The peak flight period of presumed models and mimic are the same from June to September (Ball and Morris, in preparation; Prŷs-Jones and Corbet, 1987). Although the status of *E. intricarius* is 'common' it never occurs in large numbers and is found on the same food sources as the bumble bees (e.g. bramble). The hoverfly belongs to a genus which includes some of the most commonly seen hoverflies, yet it is quite different in appearance and behaviour, indicating a shift towards a more *Bombus*-like insect. The bumble bees tend to spend much time foraging and so the presumed model and mimic species can often be observed in close proximity. Although *E. intricarius* has a rat-tailed larva like other *Eristalis* spp. it is surprising that it is not seen more often. Female *E. intricarius* were classified according to criteria (a) and (b) as specific Batesian mimics of *Bombus terrestris* and *B. lucorum*, and also (the red-tailed morph) of *B. lapidarius* and *B. ruderarius*.

Pair No. 40. *Arctophila superbiens* mimicking *Bombus muscorum* and *B. pascuorum*.

The mimic is a large hairy fly which is coloured brown or orange, sometimes with a paler grey abdomen (B.H., M.E. pers. observations). It can easily be mistaken for an orange bumble bee as it frequents the same nectar source as its model and also peaks during the time of year when the models are particularly abundant (Howarth, 1998). To add to the morphological resemblance, *A. superbiens* closely mimics bumble bee flight, spending short periods of time on one flower head before 'bumbling' on to the next (Howarth, 1998). Unlike many hoverflies, when disturbed during feeding it does not exit with rapid flight but instead gently flies on to the next flower head, much the same behaviour that can be observed in *Bombus pascuorum*. *B. muscorum* and *B. pascuorum* resemble one another closely and are part of a Müllerian mimicry complex, with *B. pascuorum* being more common.

Many hoverflies are attracted by yellow (Disney *et al.*, 1982), and *Eristalis* species have been shown to extend the proboscis towards yellow anthers while being inhibited from feeding by blue and ultraviolet (Lunau, 1988; Lunau & Wacht, 1994), but *A. superbiens* feeds on purple knapweed (*Centaurea nigra*) and bluish devil's bit

Plate 4 Top row: *Sericomyia lappona*, *Andrena flavipes*, *Andrena labialis*; second row: *Eristalis arbustorum*, *Stelis punctulatissima* male & female; third row: *Xanthogramma citrofasciatum*, *Nomada goodeniana*, *N. marshamella*; fourth row: *Xanthogramma pedissequum*, *Crabro cribrarius*, *Ectemnius* sp.; bottom row: *Pyrophaena granditarsa*, *Andrena labiata*, *Nomada fabriciana*.

Plate 5 Top row: *Criorhina ranunculi* red-tailed morph, *Bombus lapidarius*, *Volucella bombylans*; second row: *Blera fallax*, *Osmia bicolor*; third row: *Volucella bombylans* var *plumata*, *Eristalis intricarius*; fourth row: *Pocota personata*, *Bombus terrestris*; bottom row: *Eumerus tuberculatus*, *Stelis ornatula*.

scabious (*Succisa pratensis*) (Stubbs & Falk, 1983; Howarth, 1998). It seems likely that the mimicry of *A. superbiens* may include a physiological adaptation of the visual spectrum, as well as close morphological and behavioural resemblance. This hoverfly was classified according to criteria (a), (b) and (c) as a specific Batesian mimic of the proposed model group.

Pair No. 43. *Volucella bombylans* compared with *Bombus lapidarius*, *B. lucorum*, *B. ruderarius*, *B. terrestris*, and possibly *B. pascuorum* (Plate 5).

Volucella bombylans is very hairy with a broad abdomen, like a bumble bee, and is polymorphic. The typical form is black with a red tail presumably mimicking *Bombus lapidarius* and *B. ruderarius*; var. *plumata* has yellow, black and white bands and closely resembles *B. lucorum* and *B. terrestris*; and a rare brown morph appears to mimic *B. pascuorum*. The season is relatively short from May till August with a peak in June (Ball and Morris, in preparation). The fly has a 'common' status although it is rarely seen in large numbers. *V. bombylans* is associated with Hymenoptera as the larva lives in wasp nests where it is thought to scavenge or possibly be predatory on host larvae (Rotheray, 1993). The peak flight period of the *Bombus* spp. and of *V. bombylans* are the same (Howarth, 1998 for *V. bombylans*; Prŷs-Jones & Corbet, 1987 for *Bombus*). *V. bombylans* also has a similar 'bumbling' flight which adds to the close mimicry (B.H., M.E. pers. observations). *V. bombylans* was classified in accordance with criteria (a), (b) and (c) as a specific Batesian mimic.

Pair No. 53. *Criorhina berberina* compared with *Bombus pascuorum*, *B. pratorum*, and *B. terrestris*

Criorhina berberina is another densely hairy polymorphic syrphid with a black and buff banded morph (typical) presumably mimicking *Bombus terrestris* or possibly *B. pratorum*, and a brown morph, var. *oxyacanthae*, presumably mimicking *B. pascuorum*. This is the most frequently encountered of the *Criorhina* spp. (Ball and Morris, in preparation) commonly seen feeding on wild raspberry (*Rubus idaeus*) in the spring (B.H., M.E. pers observations). It is also the smallest of the *Criorhina* spp. and thus presumably a mimic of the bumble bee workers. It occurs from April till July, occasionally August, and there have been some sightings of this fly in September, indicating that it may be double brooded. The typical form is usually more frequent than var. *oxyacanthae*. This mirrors the abundance of the presumed model group as *B. terrestris* is more abundant in the spring with *B. pascuorum* at its peak in the autumn. The banded morph also resembles workers of *B. pratorum* because it is small and the bands are of equal size. The fly can often be observed feeding upside down which is a characteristic of *Bombus* spp., especially *B. pratorum*. *C. berberina* may be either a specific or a non-specific bumble bee mimic depending on the behaviour at the time. During feeding it resembles any small *Bombus* worker, but whilst at rest it more specifically resembles its respective presumed models. According to criteria (a), (b) and (c) this hoverfly is classified as a specific Batesian mimic.

Pair No. 55. *Criorhina ranunculi* compared with *Bombus lapidarius*, *B. lucorum*, *B. ruderarius*, and *B. terrestris* (Plate 5).

Criorhina ranunculi is a polymorphic species with two colour morphs, black with a red tail, presumably mimicking *B. lapidarius* and *B. ruderarius*, and black with a white or buff tail, presumably mimicking *B. lucorum* and *B. terrestris*. The hoverfly is large and hairy, the scutellum bearing slightly lighter bristles which gives the appearance of banding, as in many *Bombus* spp. In size it resembles queen bumble bees which are present at the same time; *C. ranunculi* is one of a few hoverflies found

at the beginning of the season utilising *Salix* spp. and blackthorn (*Prunus spinosa*) in March and early April, almost the only food sources available for the bumble bees at this time. To add to its morphological resemblance, *C. ranunculi* has a powerful flight, often 'bumping' into *Bombus* spp. a behaviour which could be interpreted as mate-searching (B.H. pers. observations). When caught in a net it appears to be very vicious, buzzing loudly in a *Bombus* fashion. This fly has been observed ovipositing in the afternoon at the base of trees during May (B.H. pers. observation). The models were actively collecting food from bluebells (*Scilla non-scripta*) whilst *C. ranunculi* was flying as low as the bees but landing on tree stumps and bases. The *Bombus* spp. can be found in a variety of habitats including woodlands where the mimic is present. The close morphological resemblance is greatly enhanced by the behaviour of *C. ranunculi* making it one of the most convincing specific Batesian mimics among the British fauna (classified according to criteria (a), (b) and (c)). During its flight period it occupies the canopy of its food source, hence close study is difficult, but essential for further understanding of any additional behavioural mimetic relationship.

Solitary bee mimics

Pair No. 15. *Xanthogramma citrofasciatum* compared with *Nomada goodeniana*, *Nomada marshamella*, *Nomada fulvicornis*, and *Ectemnius* spp. (Plate 4).

Xanthogramma citrofasciatum is a brightly marked yellow and black hoverfly which can be observed hovering low over the ground. Like the presumed models it has bright orange legs. *Xanthogramma pedissequum* (pair No. 16, Plate 4) may also be a mimic of *Nomada* spp., but it has orange and black legs, much more similar to *Crabro cribrarius* and *Ectemnius* spp. than to *Nomada*. Many *Nomada* bees are similar in appearance, so they may be part of a Müllerian mimicry complex from which both *Xanthogramma* spp. benefit. *Xanthogramma citrofasciatum* and *Nomada* spp. were observed at one of the survey sites in very close proximity, both hovering low over the ground, occasionally making 'jerky' movements, and difficult to distinguish from one another. The flight period overlapped very closely (Howarth, 1998). According to criteria (a), (b) and (c), *X. citrofasciatum* is classified as a specific Batesian mimic of *Nomada* spp.

Pair No. 18. *Cheilosia albipila* compared with *Andrena apicata*.

This syrphid is one of a few hoverflies that occur very early in the season (Stubbs and Falk, 1983) and hence utilise one of the only food sources present at that time of year, catkins of *Salix* spp. It is dark with brown hairs on the abdomen. This fen, marsh and wet meadow species is usually found on sunny days (Stubbs and Falk, 1983). The presumed model species can also be found in these habitats although nesting in drier sand and chalk quarries. *A. apicata* occurs throughout most of the Palaearctic; it is widely distributed in southern Britain and Ireland (Else, in preparation), and has frequently been found on sampling trips in the north west region of the UK feeding on *Salix* spp. together with its presumed mimic (C.C. pers. observations). *C. albipila* has a slightly longer flight season but peaks during the flight period of the presumed model. Similarities in morphology, flight season and food source suggest that this is a specific Batesian model mimic relationship, in accordance with criteria (a), (b) and (c).

Pair No. 21. *Cheilosia impressa*, *C. mutabilis*, *C. nebulosa*, *C. pagana*, and *C. vernalis* compared with *Lasioglossum albipes* and *L. fratellum*.

Both models and mimics are small, brown and shiny, and often occur on ground flowers. Although two bee species were identified, it is possible that other small bees in the genera *Halictus* and *Andrena* are part of this proposed model/mimic pair. These genera are often confused (Chinery, 1993), and before describing habitat and seasonal occurrence in detail, further study of this group is needed. This mimic group was classified in accordance with criterion (a) as non-specific Batesian mimics of the proposed model group.

Hive bee mimics

Pair No. 29. *Eristalis arbustorum* compared with *Andrena flavipes*, *Stelis punctulatissima* and *Apis mellifera* (Plate 4).

This is one of the commonest British species of hoverflies, occurring in habitats varying from farmyards to open natural habitats (e.g. Stubbs and Falk, 1983). It is a large fly, very variable in colour (Holloway, 1993), and is widely classed as a bee mimic (Stubbs and Falk, 1983). However, Heal (1981) discusses sexual dimorphism where the females mimic several small, dark (mainly mining) bees, and the males less specifically mimic wasps and other yellow and black Hymenoptera. Because the males of this hoverfly have orange rather than yellow markings, they may also be honey bee mimics. *E. arbustorum* also resembles *Andrena flavipes* whose distribution is mainly southern and European, but the flight periods are the same (Else in preparation; Stubbs and Falk, 1983). The other suggested model, *Stelis punctulatissima*, is morphologically very similar to female *E. arbustorum*, but this is also a southern British species which does not occur frequently (Else, in preparation). Due to its large variability, *E. arbustorum* is classified according to criterion (a) as a non-specific Batesian Hymenoptera mimic. It would be interesting to compare colour variation found in Britain to that of other European districts, together with model frequencies.

Pair No. 31. *Eristalis pertinax*, *E. rupium* and *E. tenax* compared with *Apis mellifera*.

These three hoverflies (droneflies) are very similar to one another, although *Eristalis pertinax* usually has a more pointed abdomen, and all three species can vary in coloration. All three are widely accepted as being hive bee mimics (e.g. Gilbert, 1986; Stubbs and Falk, 1983). *E. rupium* is the least frequent syrphid of the group and its status is listed as 'notable' (Falk, 1991). *E. pertinax* and *E. tenax* are amongst the commonest hoverflies, widely distributed throughout the British Isles in many habitats. *Apis mellifera* is also found in most habitats and is often abundant, but not always as numerous as the *Eristalis* spp., and wild colonies are rarely observed in Britain. It is mainly a domesticated insect which has possibly increased its distribution and frequency since being farmed. Regardless of domestication, *A. mellifera* has been present in Britain, both wild and domesticated, for probably more than 1000 years. The effects of domestication of *A. mellifera* on the evolution of mimicry in the Syrphidae are unknown.

The mimic group also has some behavioural similarities in flight to honey bees. Honey bees can often be observed 'brushing' their legs in flight to collect any pollen. *Eristalis* spp. appear to move their legs in a similar fashion with no obvious function. This may be behavioural mimicry. The *Eristalis* spp. have therefore been classified according to criteria (a), (b) and (c) as specific Batesian mimics.

Pair No. 48. *Brachypalpus laphriformis* compared with *Apis mellifera* and *Colletes* spp. (Plate 1).

Although we have concluded that *Eristalis* spp. (pair no. 31) are specific honey bee mimics, *Brachypalpus laphriformis* and *Criorhina asilica* (pair nos 48 & 52) resemble honey bees even more closely. *Brachypalpus laphriformis* is a rarely encountered syrphid which has a 'notable' status (Falk, 1991). It is mainly found in the southern parts of Britain and is most frequent where there are areas with dead wood and in ancient forests. It has been seen in Lancashire but records are usually only one or two per season. The morphological resemblance is very precise, resembling the typical form of *A. mellifera*, whereas *Eristalis tenax*, *pertinax* and *rupium* (pair no. 31) resemble the introduced Italian variety. According to criteria (a), (b) and (c) the hoverfly has been classified as a specific Batesian mimic of *A. mellifera*.

A second model has been suggested due to the hairiness of the mimic. *Colletes succinctus* (L.) resembles *A. mellifera* although it is mostly found in sandy areas as it is ground-nesting. It occurs from July till September whereas the presumed mimic occurs from May till August. It is possible that *Colletes* spp. and honey bees are part of a Müllerian mimicry complex and that the hoverfly benefits from resembling several species of model.

Pair No. 52. *Criorhina asilica* mimicking *Apis mellifera* (Plate 1).

Morphologically *C. asilica* mimics *A. mellifera* closely except for the antennae. Personal observations have been mainly on wild raspberry in woodland clearings where it occurs together with its model. *C. asilica* is one of the rarer British hoverflies with saprophagous larvae which utilise decaying heartwood (Rotheray, 1993). The mimic has a very powerful flight and if disturbed at a food source will rapidly escape to the nearest woodland canopy (B.H. pers. observation). This mimic has been classified according to criteria (a), (b) and (c) as a specific Batesian mimic of *A. mellifera*.

Discussion

The tentative matching of model/mimic pairs attempted here is not without problems. Although careful attention was paid to behaviour, in many cases behaviour of the model, mimic, or both has not been observed, and therefore matching can only be based on morphological and ecological evidence found in the literature, and on similarities observed in pinned museum specimens. The examples of *Episyrphus balteatus* and *Callicera spinolae* illustrate how conclusions as to which species is being mimicked based on museum material may be contradicted by field observations. Another example is the rare syrphid *Caliprobola speciosa* (pair no. 49), of which Raymond Uffen (pers. comm.) writes:

> "*Caliprobola speciosa* is a case of multifaceted mimicry and camouflage. It looks like nothing else, but you see it first as one thing, then another as it glints in the sun and seems to change shape and colour. True, its yellow-shaded wings and reflections off its abdominal hair bands can give the instantaneous impression of a wasp, but it has gone as soon as you or the fly move. When the sun goes in and a fly is left with its yellow wings closed, it is camouflaged sitting on rotten beech wood. With the wings splayed, the green body camouflages it in dull light on foliage. H. E. Hinton proposed that the brilliant, directionally reflective, structural colours of some ground beetles could confuse predators as the prey ran amongst vegetation on the ground, the colours now visible, now not, then changing. *Caliprobola speciosa* seems to be a chimera with an element of golden metallic glint superimposed on a cryptic

background. In a more restrained way than Hinton's beetles it lacks a visual identity."

C. speciosa clearly requires thorough ecological and behavioural investigation before its mimicry status can be confirmed.

It has been suggested that it would be helpful to categorise the 59 pairs according to the likelihood that they really are examples of mimicry (anonymous reviewer). However, our experience with *Episyrphus balteatus* and *Callicera spinolae* suggests that there may be several other pairs in which the hymenopteran most similar to the syrphid is not actually the model. Some flies may derive benefit from mimicking two quite different models, one which is comparatively rare or local (at least in this country) which they resemble very precisely, and the other which is common (perhaps a social species) which they resemble much less closely but sufficiently to give some protection. Only thorough experimental investigation will reveal if there is mimetic advantage to the hoverflies listed in Table 1.

It could be argued that by comparing two insect taxa which are both very diverse, pairs with similar colour patterns are almost sure to be found irrespective of whether mimicry is involved. However, a similar exercise with other families of Diptera such as the Muscidae would give very few matching pairs. It is probable therefore that many of the model/mimic pairs proposed here do indicate a mimetic relationship.

Another problem is the classification of colour and pattern. The human eye perceives colour in the visible spectrum of 400–700 nm (Wessells & Hopson, 1988). If mimicry is to be effective the mimic needs to copy the visual cues displayed by the model to confuse or deceive the predator. Recent research has shown that birds appear to be more sensitive to UV wavelengths (300–400 nm) than to the human-visible spectrum (Bennett & Cuthill, 1994). It may be the case that 'human' classification of flies and Hymenoptera into model/mimic pairs is not representative of how these species are perceived by the predators. Furthermore, with little evidence as to whether the main predators of hoverflies are birds (e.g. gull-billed tern *Gelochelidon nilotica*, Satheesan, 1990) or insects (e.g. the wasp *Ectemnius cavifrons*, Pickard, 1975), it is impossible to accurately describe what part of the mimicry is deceiving the predator: it could be morphology, behaviour, pheromones or a combination of any of these.

The examples of mimicry described here distinguish between non-specific mimics, which have a general similarity to the model, and specific mimics, which have a much closer resemblance in morphology, colour, pattern and behaviour. If specific mimics have evolved from non-specific mimics then one may also find mimics intermediate between these two categories in their degree of resemblance to the model. There must surely be a continuum between non-specific and specific mimics, the precise degree of similarity to the model depending on the perceptive abilities of the relevant predators: a hoverfly that is a poor morphological mimic may be a good behavioural mimic, and *vice versa*. Examination of Table 1 and the model-mimic pairs discussed above enable other conclusions to be drawn relating to generalist (non-specific) and specific mimics. Generalist mimics are common, occur in a variety of habitats, and have larval habits that do not restrict the flies to a narrow range of breeding habitats. Specific mimics are less common, occur in only some habitats (i.e. are local) and include some species whose larval habits restrict them to specific habitats. For example, *Syrphus* spp. are very common non-specific Batesian mimics, with a rather poor resemblance to wasps, occur in a wide variety of habitats, and have aphidophagous larvae; while *Criorhina* spp. are specific Batesian mimics, which are all highly accurate mimics to the human eye, and are restricted to semi-natural

ancient woodland because the larvae breed in dead wood (see Table 1). Table 2 summarises the conclusions as to which of the species discussed in this paper are likely to be specific mimics and which are non-specific mimics. It only lists the species discussed in detail together with *Criorhina floccosa* which has been observed in the field during the course of this study.

Bumble bees occur quite commonly in forests, woodland margins and clearings, and have habits which make them seem very numerous to a potential predator. Being social insects, bumble bees are frequently seen near their nest sites. The potential predator will encounter bumble bees frequently in such an area although very often they may be repeat sightings of the same individuals returning from foraging trips. The occasional specific mimic will presumably be difficult to distinguish from the model. The question arises: what and where are the predators against which mimicry has evolved? Wooded districts are likely to include bird predators nesting in the trees, and this may be the reason why many ancient woodland species are specific mimics. Maier (1978), who studied American syrphids, concluded that specialised mimics spend most of their life in forested areas where there is a high abundance of avian predators. Our data on specific British bumble bee mimics suggest that these too are predominantly woodland species.

Some of the syrphids which seem rather unconvincing mimics to the human eye may reflect UV (which humans cannot see) and thus may look much more like the model to potential predators. Dittrich *et al.* (1993) conducted experiments with photographic slides of several syrphids and model species. The reaction of pigeons to the slides showed that two common hoverflies which are non-specific yellow and black mimics, *Episyrphus balteatus* and *Syrphus ribesii*, were ranked as very similar to the wasps shown to the pigeons although neither is especially wasp-like to human eyes. Cuthill & Bennett (1993) argued that the differences between avian and primate colour vision were responsible for the categorisation of the pigeons as the slides were designed for human vision and therefore lacked the natural colour information which wild birds perceive, especially UV. This would explain why the museum-based comparison in Table 1 showed *E. balteatus* as being a mimic of *Nomada* instead of wasps.

Many of the proposed mimics resemble social Hymenoptera or large solitary wasps (e.g. *Ectemnius* spp.) which have stings that are painful to humans and to some birds. Such birds will learn to avoid the models and may then be deceived into ignoring the mimics. Other proposed mimics resemble small species of solitary bee or wasp whose stings are much less virulent, at least to humans. The question then arises of whether a predator would find these hymenopterans unpleasant: if not then there can be no advantage in a hoverfly mimicking them. However, the solitary wasps which prey on insects or spiders are likely to have stings that are effective against insect predators, so it may pay a syrphid to mimic these wasps. Many of the smaller hymenopterans are also very agile in flight and may be difficult for predators to catch. Predators may then learn that it is not profitable to chase them. Small syrphids that resemble such hymenopterans could be Batesian or Müllerian mimics (Edmunds, 1974; Gibson, 1974, 1980).

Some of the model-mimic pairs described above have different spatial distributions. In most cases all species proposed as a pair are fairly mobile and will forage for food in a variety of habitats so that co-occurrence between model and mimic will take place. However, there are some pairs suggested above that are very unlikely to occupy the same habitats, e.g. pair no. 46. *Blera fallax*, apart from not being hairy, resembles the model group closely in morphology and seasonal flight period (Plate 5). In Britain this rare hoverfly only occurs in east Scotland whereas the model is a

Table 2. Tentative conclusions as to the nature of the Batesian mimicry of hoverflies discussed in the text.

No.	Hoverfly (above) and Proposed Model Species (below)	Conclusion
1.	*Baccha elongata*, *B. obscuripennis* *Trypoxylon attenuatum*, *T. clavicerum*	Specific mimic
2.	*Melanostoma* spp., *Platycheirus* spp. with yellow markings *Crossocerus quadrimaculatus*	Non-specific mimic
4.	*Chrysotoxum arcuatum*, *C. cautum*, *C. elegans*, *C. octomaculatum*, *C. verralli* *Dolichovespula* spp. and *Vespula* spp., *Anthidium* spp.	Specific mimic
9.	*Episyrphus balteatus* *Nomada* spp.	Non-specific mimic of black & yellow wasps
14.	*Syrphus* spp. *Dolichovespula* spp. and *Vespula* spp.	Non-specific mimic
15.	*Xanthogramma citrofasciatum* *Nomada goodeniana*, *N. marshamella*, *N. fulvicornis*, *Ectemnius* spp.	Specific mimic
16.	*Xanthogramma pedissequum* *Crabro cribrarius*, *Ectemnius* spp., *Nomada* spp.	Specific mimic
17.	*Callicera aenea*, *C. rufa*, *C. spinolae* *Osmia* spp., *Anthophora* spp., *Eucera longicornis*	Specific mimic of social wasps
18.	*Cheilosia albipila* *Andrena apicata*	Specific mimic
21.	*Cheilosia impressa*, *C. mutabilis*, *C. nebulosa*, *C. pagana*, *C. vernalis* *Lasioglossum albipes*, *L. fratellum*	Non-specific mimic
22.	*Cheilosia illustrata* *Andrena cineraria*, *Bombus pratorum*	Non-specific mimic
29.	*Eristalis arbustorum* *Apis mellifera*, *Andrena flavipes*, *Stelis punctulatissima*	Non-specific mimic
30.	*Eristalis intricarius* *Bombus terrestris*, *Bombus pratorum*	Female: specific mimic; male: non-specific mimic
31.	*Eristalis pertinax*, *E. rupium*, *E. tenax* *Apis mellifera*	Specific mimic
32.	*Helophilus* spp. *Dolichovespula* spp. and *Vespula* spp.	Non-specific mimic
40.	*Arctophila superbiens* *Bombus muscorum*, *B. pascuorum*	Specific mimic
42.	*Sericomyia silentis* *Dolichovespula* and *Vespula* spp.	Specific mimic
43.	*Volucella bombylans* *Bombus lapidarius*, *B. lucorum*, *B. ruderarius*, *B. terrestris*, and possibly *B. pascuorum* (pale variety)	Specific mimic
48.	*Brachypalpus laphriformis* *Colletes* spp., *Apis mellifera*	Specific mimic
52.	*Criorhina asilica* *Apis mellifera*	Specific mimic
53.	*Criorhina berberina* *Bombus pascuorum*, *B. pratorum*, *B. terrestris*	Specific mimic
54.	*Criorhina floccosa* *Bombus muscorum*, *B. pascuorum*	Specific mimic
55.	*Criorhina ranunculi* *Bombus lapidarius*, *B. lucorum*, *B. ruderarius*, *B. terrestris*	Specific mimic

southern and European species. In Europe the hoverfly is much commoner. Avian predators are very mobile and many are migratory. It is possible that bird predators would have learned to avoid the models of *Blera fallax* during migration. Avoidance learning of models and mimics by birds could occur in several ways: the bird (a) encounters and learns to avoid both model and mimic in the same area; (b) learns to avoid the model in one place, migrates, and then avoids the mimic in another place; (c) learns to avoid the model in one place, migrates, and remembers to avoid both model and mimic on its return (Waldbauer, 1988 and earlier, concludes that birds in the United States behave as in (c)).

Another example of differing spatial distribution is pair no. 12, *Scaeva pyrastri* and *Bembix rostrata* (Plate 3). There is close morphological resemblance between these two species, including size, pattern of white markings on the abdomen, yellow legs and a very similar head shape and coloration. Although *S. pyrastri* appears as a British hoverfly, its status is a 'migrant' which reaches the British Isles in June/July from southern Europe (Ball & Morris, in preparation). *Bembix rostrata* is a European species, thus it is likely that this is a Batesian mimicry relationship. The migratory nature of this hoverfly is more than likely due to its larval feeding habits on ground layer and arboreal aphids which are also known to migrate. How the Batesian mimicry of *S. pyrastri* is maintained when it is away from its proposed model may be better understood if the predators were known.

It is indisputable that many hoverflies closely resemble certain Hymenoptera, and so it seems probable that many of them gain protection from this resemblance. Table 1 proposes 59 possible model/mimic pairs, but only a thorough investigation of the behaviour of these pairs will support or refute these proposals.

Acknowledgements

We are grateful to George Else, Graham Rotheray, Raymond Uffen, Stuart Ball and Roger Morris for permission to publish information they hold; to Francis Gilbert and Jon Heal for advice and encouragement; to Mike Taylor for taking photographs of models and mimics; and to Liverpool Museum for providing facilities for part of this work. B.H. was supported by a University of Central Lancashire research studentship.

References

Andrewes, H.W. 1944. *Cheilosia albipila* Meigen bred. *Entomologist's Record and Journal of Variation*, **56**: 71.

Bennett, A.T.D., Cuthill, I.C. 1994. Ultraviolet vision in birds: what is its function? *Vision Research*, **34**: 1471–1478.

Chinery, M. 1986. *Collins Guide to the Insects of Britain and Western Europe*. London: Collins.

Chinery, M. 1993. *A Field Guide to the Insects of Britain and Northern Europe*. London: Harper Collins.

Coe, R.L. 1942. *Rhingia campestris* Meigen (Dipt., Syrphidae) an account of its life-history and descriptions of the early stages. *Entomologist's Monthly Magazine*, **78**: 121–130.

Creager, D.B., Spruijt, F.J. 1935. The relation of certain fungi to larval development of *Eumerus tuberculatus* Rondani (Syrphidae, Diptera). *Annals Entomological Society America*, **28**: 425–437.

Cuthill, I.C., Bennett, A.T.D. 1993. Mimicry in the eye of the beholder. *Proceedings of the Royal Society B*, **253**: 203–204.

Decleer, K., Rotheray, G.E. 1990. The puparium and larval habitat of the hoverfly *Tropidia scita* (Diptera: Syrphidae). *Entomologist's Gazette*, **41**: 157–160.

Disney, R.H.L., Erzinçlioglu, Y.Z., Henshaw, D.J.D., Howse, D., Unwin, D.M., Withers, P., Woods, A. 1982. Collecting methods and the adequacy of attempted fauna surveys, with reference to the Diptera. *Field Studies*, **5**: 607–621.

Dittrich, W., Gilbert, F., Green, P., McGregor, P. and Grewcock, D. 1993. Imperfect mimicry: a pigeon's perspective. *Proceedings of the Royal Society B*, **251**: 195–200.

Edmunds, M. 1974. *Defence in animals: a survey of anti-predator defences*, Harlow: Longman.

Falk, S.J. 1991. *A Review of the scarce and threatened flies of Great Britain (Part 1)*, Peterborough: Nature Conservancy Council.

Friederichs, K., Schaerffenberg, B., Sturn, H. 1940. Über die Feinde des Kiefernspanners mit Berücksichtigung des Mischwaldes. *Zeitschrift für Angewandte Entomologie*, **27**: 621–641.

Gäbler, H. 1939. Die Bedeutung der Larven von *Syrphus tricinctus* Fall. Für die Vernichtung von Raupen und Afterraupen. *Tharandter Förstliches Jahrbüch*, **90**: 69–74.

Gibson, D.O. 1974. Batesian mimicry without distastefulness. *Nature*, **250**: 77–79.

Gibson, D.O. 1980. The role of escape in mimicry and polymorphism: I. the response of captive birds to artificial prey. *Biological Journal of the Linnean Society*, **14**: 201–214.

Gilbert, F.S. 1986. *Hoverflies*, Cambridge: Cambridge University Press.

Heal, J.R. 1979. Colour patterns of Syrphidae. II. *Eristalis intricarius*. *Heredity*, **43**: 229–238.

Heal, J.R. 1981. Colour patterns in Syrphidae. III. Sexual dimorphism in *Eristalis arbustorum*. *Ecological Entomology*, **6**: 119–127.

Hodson, W.E.H. 1932. The large narcissus fly *Merodon equestris*, Fab. (Syrphidae). *Bulletin Entomological Research*, **23**: 429–448.

Holloway, G.J. 1993. Phenotypic variation in colour pattern and seasonal plasticity in *Eristalis* hoverflies (Diptera: Syrphidae). *Ecological Entomology*, **18**: 209–217.

Howarth, B. 1998. An ecological study of Batesian mimicry in the British Syrphidae (Diptera). Unpublished PhD thesis, University of Central Lancashire, pp. 1–241.

Kormann, K. 1988. *Schwebfliegen Mitteleuropas*, Landsberg/ Munich: Ecomed Verlagsgesellschaft mbH.

Kula, E. 1983. The larva and puparium of *Eriozona syrphoides* (Fallén) (Diptera, Syrphidae). *Acta Entomologica Bohemoslovaca*, **80**: 71–73.

Lindroth, C.G. 1971. Disappearance as a protective factor. *Entomologica Scandinavica*, **2**: 41–48.

Lunau, K. 1988. Angeborenes und erlerntes Verhalten beim Blütenbesuch von Schwebfliegen—Attrappenversuche mit *Eristalis pertinax* (Scopoli) (Diptera, Syrphidae). *Zoologische Jahrbüch Physiologie*, **92**: 487–499.

Lunau, K., Wacht, S. 1994. Optical releasers of the innate proboscis extension in the hoverfly *Eristalis tenax* L. (Diptera, Syrphidae). *Journal of Comparative Physiology A*, **174**: 575–579.

Lundbeck, W. 1916. *Diptera Danica 5. (Lonchopteridae, Syrphidae)*, Copenhagen: G.E.C.Gad.

Maier, C.T. 1978. Evolution of Batesian mimicry in the Syrphidae (Diptera). *Journal of the New York Entomological Society*, **76**, 307.

Pickard, R.S. 1975. Relative abundance of syrphid species in a nest of the wasp *Ectemnius cavifrons* compared with that in the surrounding habitat. *Entomophaga*, **20**: 143–151.

Prŷs-Jones, O.E. and Corbet, S.A. 1987. *Bumblebees*, Cambridge: Cambridge University Press.

Richards, O.W. 1980. *Scolioidea, Vespoidea and Sphecoidea (Hymenoptera, Aculeata)*, *Handbooks for the Identification of British Insects*, **6**(3b) 118 pp. London: Royal Entomological Society.

Rotheray, G.E. 1988. Larval morphology and feeding patterns of four *Cheilosia* species (Diptera: Syrphidae) associated with *Cirsium palustre* (L.) Scopoli (Compositae) in Scotland. *Journal of Natural History*, **22**: 17–25.

Rotheray, G.E. 1993. *Colour Guide to Hoverfly Larvae (Diptera, Syrphidae) in Britain and Europe*, Sheffield: Derek Whiteley.

Rotheray, G.E., Barr, B., Hewitt, S.M. 1996. The myrmecophilous larvae of *Chrysotoxum arcuatum*, *Pipizella varipes* and *Xanthogramma pedissequum* from Europe and *Platycheirus milleri* from New Zealand. *Entomologist's Record and Journal of Variation*, **108**, 257–265.

Rotheray, G.E., Gilbert, F.S. 1989. The phylogeny and systematics of European predaceous Syrphidae (Diptera) based on larval and puparial stages. *Zoological Journal of the Linnean Society*, **95**: 29–70.

Rotheray, G.E., Stuke, J.H. 1998. Third stage larvae of four species of saproxylic Syrphidae (Diptera), with a key to the larvae of British *Criorhina* species. *Entomologist's Gazette*, **49**: 209–217.

Rupp, L. 1989. The mid-European species of *Volucella* as commensals and parasitoids in the nests of bees and social wasps: studies on host finding, larval biology and mimicry. PhD thesis, Albert Ludwigs Universitaet, Freiburg.

Satheesan, S.M. 1990. Hoverfly *Eristalis* sp. among the stomach contents of gull-billed tern *Gelochelidon nilotica* Gmelin. *Journal of the Bombay Natural History Society*, **87**: 144.

Stubbs, A.E., Falk, S.J. 1983. *British Hoverflies*, London: British Entomological & Natural History Society.

Waldbauer, G.P. 1970. Mimicry of hymenopteran antennae by Syrphidae. *Psyche, Cambridge, Mass.*, **77**: 45–49.

Waldbauer, G.P. 1988. Asynchrony between Batesian mimics and their models. *American Naturalist*, **131** Suppl.: S103–S121.

Wessels, N.K., Hopson, J.L. 1988. *Biology*, New York: Random House.

Yeo, P.F., Corbet, S.A. 1983. *Solitary Wasps*, Cambridge: Cambridge University Press.

SHORT COMMUNICATION

***Conocephalus discolor* (Thunberg) (Orthoptera: Tettigoniidae) new to Wales.**— During a survey on 15.viii.1999 by members of the Cardiff Naturalists' Society, of the wildlife within a large road interchange (M4 Junction 32) at Coryton on the northern outskirts of Cardiff, we discovered a colony of *Conocephalus discolor* (long-winged cone-heads). A further visit a few days later confirmed that nymphs, adult males and especially adult females of this species were present on at least three separate parts of the interchange. The site (ST140816) is the area within the M4/A470 interchange, about 10 hectares of rough grassland, shrubs and trees. The cone-heads were found in areas of damp grassland.

Since the early 1980s this species has expanded its range northwards from the south coast of England (Marshall & Haes, 1988; Haes & Harding, 1997; Widgery, 1999). This is considered to be as a result of climate change (global warming). Although few records of Welsh Orthoptera have been submitted recently to the National Orthoptera Recording Scheme, the nearest previous sightings are some distance away 65 km to the south in Somerset and 85 km to the east in Gloucestershire (J. Widgery, *pers comm.*). The site's proximity to the M4 raises intriguing questions about the means and source of colonisation.

Our thanks to Mike Wilson and John Deeming at the National Museums and Galleries of Wales for confirming identification. LINDA & ROB NOTTAGE, 32 Village Farm, Bonvilston, Cardiff CF5 6TY.

REFERENCES

Haes, E. C. M. and Harding, P. T. 1997. *Atlas of grasshoppers, crickets and allied insects in Britain and Ireland*. London: The Stationery Office.

Marshall, J. A. and Haes, E. C. M. 1988. *Grasshoppers and allied insects of Great Britain and Ireland*. Colchester: Harley.

Widgery, J. 1999. Wildlife Reports. *British Wildlife* **10**: 199, 352.

SHORT COMMUNICATION

***Dienerella filum* (Aubé) and *Adistemia watsoni* (Wollaston) (Coleoptera) in Epsom, Surrey.**—A concrete multi-storey car-park is not the place where interesting beetles are normally found but one in the centre of Epsom recently proved an exception. Returning to our car after shopping (21.viii.99), my wife and I noticed a large accumulation of pigeon droppings on the third floor of the car park. Examining at home a portion taken later, I was surprised to find the droppings contained two beetle species—*Dienerella filum* and *Adistemia watsoni*—which I had not previously encountered. Both were present in some numbers, accompanied by examples of *Latridius pseudominutus* (Strand), *Stegobium panaceum* (L.) and *Anthrenus* larvae. The droppings lay on a bare concrete floor about 3 m from a large opening to the outside.

D. filum was first noted in Britain in herbaria (Fowler, 1889). Subsequently, it has turned up here mainly in museums. Hinton (1945), however, records its occurrence on the Continent in damp houses and among stored cereals.

A. watsoni was first found in Britain in 1907 in the Geological Department of the British Museum (Champion, 1912). Since then, it has been recorded from various parts of the British Isles, mainly in museums but on a few occasions from suburban homes and gardens (see e.g. MacKechnie Jarvis, 1972; Allen, 1988). In Germany, it was first recorded from a pigeon's nest on the Rathaus (Town Hall) in Hamburg (Lefkovitch, 1960); von Peez (1967) also refers to its occurrence in pigeons' nests in Hamburg but this may be a repeat of Lefkovitch's record. In Florida, it has been found out of doors in flowers of *Astragalus* (Watson, 1922).

The number of examples of both species present indicated that they had been breeding in the pigeon droppings, but how they arrived at the car park is a matter for speculation. Neither species can fly. The car park is used almost exclusively by shoppers but there is an area at ground level outside the car-park for servicing a number of large shops including some selling food. Carriage in the plumage of a pigeon would seem just possible. I am grateful to Dr D. G. H. Halstead for providing me with a copy of the paper by Lefkovitch.—J. A. OWEN, 8 Kingsdown Road, Epsom, Surrey KT17 3PU.

REFERENCES

Allen, A. A. 1988. *Adistemia watsoni* (Woll.) (Col.: Lathridiidae); a third occurrence in West Kent. *Entomologist's Record and Journal of Variation* **100**: 274.

Champion, G. C. 1912. A note on two introduced species of Lathridiidae. *Entomologist's monthly magazine* **48**: 10.

Fowler, W. W. 1889. *The Coleoptera of the British Islands*. vol 3. L. Reeve & Co., London.

Hinton, H. E. 1945. *A monograph of the beetles associated with stored products*. vol. 1 British Museum (Natural History), London.

Lefkovitch, L. P. 1960. *Adistemia watsoni* (Wollaston) (Coleoptera: Lathridiidae) in a bird's nest in Hamburg. *Entomologische Mitteilungen aus dem Zoologischen Staatsinstitut und Zoologischen Museum, Hamburg* **27**: 12–13. Hamburg.

MacKechnie Jarvis, C. 1972. *Adistemia watsoni* (Woll.) (Col., Lathridiidae) in London, S.W.1. *Entomologist's monthly magazine* **107**: 144.

von Peez, A. 1967. in *Die Käfer Mitteleuropas*. vol 7: ed H. Freude, K. W. Harde & Lohse, G. A. Goecke & Evers, Krefeld.

Watson, J. R. 1922. Some beetles new to Florida. *Florida Entomologist* **5**: 67–68.

THE 1997 PRESIDENTIAL ADDRESS—PART 2 WHY DO NAMES CHANGE?

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Few things annoy amateur entomologists more than the changes in names of familiar species. This paper is an attempt to describe some of the problems, and the rules or abuse of them which cause the changes to occur. In order to illustrate this, changes in the list of British Lepidoptera since Emmet (1991) are listed, except those treated in Emmet (1996b) (Volume 3 of *The Moths and Butterflies of Great Britain and Ireland*) where adequate detail is given. For those families, only changes since publication of that work are given. There will be little in the paper to interest an experienced taxonomist, other than some pleas and correctives.

The rules of nomenclature are laid down by the International Code of Zoological Nomenclature (ICZN) managed by a trust based within the Natural History Museum in London. The 4th edition is now in force (from Jan 2000). The object of the Code is to promote stability and universality in the scientific names of animals and to ensure that the name of each taxon is unique and distinct.

Those who complain about name changes may be surprised by this emphasis; the problems arise from the next paragraph in the Preamble to the Code. "Priority is the basic principle of zoological nomenclature. Its application may be moderated, however, under conditions specified in the Code to conserve a long-accepted name in its accustomed meaning." This means that the oldest name rules, unless another has become established. This sounds fine, but there are authors who argue that the oldest name should be used whenever possible. In general, as soon as someone brings an old name into use, that name has priority and is no longer classed as forgotten (or a *nomen oblitum*). The procedure for having an older name suppressed, because it has not been used for over 50 years, is involved and lengthy and this often deters scientists from making applications to the Commission—which has to be done individually for each name. A proposal circulated for inclusion in the new Code was that names over 50 years out of use should automatically be suppressed even if they have priority, but this did not meet with the unanimous approval it deserved. However, the new Code (4th edition) will give more powerful support to the maintenance of names in use, hopefully making an end to the spate of changes to which we have been subject.

The scientific name of a species consists of two parts (a binomen), the genus and species name. If there are more or less than two names it is invalid. The authors name and the date of description are not obligatory but are useful to avoid confusion. A subspecific name is a trinomen. Any name inserted in parentheses between the generic and specific name, such as subgenus or species-group, is not part of the name proper.

The specific names are those to which I will give most attention. Higher classification can be problematic and can be at the whim of a reviser, although we can hope for stability in the use of generic and family names! The species is not such a watertight entity as was once thought, as will be apparent when we look at examples.

Which species is implied by a given name? Ideally this is determined by the type specimen or holotype, i.e. the specimen used for the species description. Any new species nowadays will have the holotype designated, but this was not the case for

many older named species. A description in the literature was sufficient to define a species, even of the early stages without the adult. Problems arise when it is not clear to which species a name applies. Ascertaining the date of publication (which is what counts for the purpose of priority) is also a problem with some early works, since they were not always dated or else were published over a period in serial form. At times it is not clear who is the author, for although a name may have been proposed by one scientist and become used by others, it is the first published use of it which decides the authorship, even if that was not the original proposer of the name. In the middle of the last century many species were being described and the communications between authors were considerable. At times names were in use before they were published and if one author misinterpreted the name of another, two different species could be described under the same name.

Gender is another issue which affects the endings of names. Most Lepidoptera have names which are feminine, reflecting the delicacy and beauty of the insects (in contrast with horny insects like beetles which are mostly given masculine gender!). According to ICZN rules the gender of a species should agree with that of the genus in which it is placed. This means if a species is assigned to a new genus of different gender the name will change, so for example the clouded yellow used to be known as *crocea* or *edusa*, but now it is in the genus *Colias* it has become *croceus*. Similarly the common swift *lupulina* was described in *Phalaena*, but since it has been placed in *Hepialus* or *Korscheltellus* the specific name has become *lupulinus*. Many generic names have no gender, or it is not possible to know what it should be. This has led some scientists to regard all scientific names as nouns and to use the original spelling regardless of gender, especially now that most scientists no longer have a classical education and know little of Latin or Greek. Lepidopterists have been foremost in adopting this view and were pleased when a proposal for the new Code to this effect was circulated, but it was rejected by most other taxonomists.

The following are changes currently being imposed that illustrate the above and some other problems as examples.

Senior synonyms

Most species names change because an older name has been discovered. The younger name becomes a synonym of the older name, which has priority. Most entomologists will be familiar with the use of parentheses, placed round the author's name when the species is in a different genus to that in which it was originally described. Square brackets are used when the actual date of publication differs from that on the title page, e.g. Meyrick's *Revised Handbook* is dated 1927, but did not appear until 1928. Therefore it is cited as Meyrick [1928]. Table 1 gives changed names since Emmet (1991).

In some cases a name has to be replaced because it is discovered that the name in use is a homonym, that is an older combination of the same names existed, sometimes written *nec* and the earlier author's name and date.

Cases of this kind are:

Pammene aurita Razowski, 1991	*P. aurantiana* (Staudinger, 1871) preocc.
Eilema depressa (Esper, 1787)	*E. deplana* (Esper, 1787) preocc.

In the majority of cases listed the senior synonym has not been in use for 50 years, sometimes for 200 years, and there could have been made an application to have the name suppressed, but it would have meant a lot of applications. In some of these

Table 1.

New name	Former (junior) name
Eriocrania cicatricella (Zett., 1839)	*E. haworthi* Bradley, 1966
Lampronia corticella (L., 1758)	*L. rubiella* (Bjerkander, 1781)
Diplodoma laichartingella (Goeze, 1783)	*D. herminata* (Fourcroy, 1785)
Narycia duplicella (Goeze, 1783)	*N. monilifera* (Fourcroy, 1785)
Bacotia claustrella (Bruand, 1845)	*B. sepium* (Speyer, 1846)
Bucculatrix obscurella Klemensiewicz, 1899	*B. capreella* Krogerus, 1952
Phyllonorycter kuhlweiniella (Zeller, 1839)	*P. saportella* (Dup., [1840])
Phyllonorycter esperella (Goeze, 1783)	*P. quinnata* (Fourcroy, 1785)
**Paraswammerdamia nebulella* (Goeze, 1783)	*P. lutarea* (Haworth, 1828)
Ochsenheimeria taurella ([D. & S.], 1775)	*O. mediopectinellus* (Haworth, 1828)
**Coleophora kuehnella* (Goeze, 1783)	*C. palliatella* (Zincken, 1813)
Coleophora inulicolella Bruand, 1859	*C. inulae* Wocke, 1876
Elachista maculicerusella Bruand, 1859	*C. monosemiella* Rössler, 1881 =*cerusella* (Hübn., 1796) preocc.
Diurnea lipsiella ([D. & S.], 1775)	*D. phryganella* (Hübn., 1796)
Ethmia quadrillella (Goeze, 1783)	*E. funerella* (Fab., 1787)
Depressaria sordidatella Tengström, 1848	*D. weirella* Stainton, 1849
Pancalia schwarzella (Fab., 1798)	*P. latreillella* Curtis, 1830
Dichomeris derasella ([D. & S.], 1775)	*D. fasciella* (Hübn., 1796)
Mompha sturnipennella (Treitschke, 1833)	*M. nodicolella* Fuchs, 1902
Acleris kochiella (Goeze, 1783)	*A. boscana* (Fab., 1794)
Epiblema sticticana (Fab., 1794)	*E. farfarae* (Fletcher, 1938)
Phiaris micana ([D. & S.], 1775)	*P. olivana* (Treitschke, 1830)
Agdistis meridionalis (Zeller, 1847)	*A. staticis* Millière, 1875
Stenoptilia millieridactyla (Braund, 1861)	*S. saxifragae* Fletcher, 1940
Dioryctria simplicella Heinemann, 1863	*D. mutatella* Fuchs, 1903
Myelois circumvoluta (Fourcroy, 1785)	*M. cribrella* (Hübn., 1796)
**Nymphula nitidulata* (Hufnagel, 1767)	*N. stagnata* (Donovan, 1806)
Pyrausta despicata (Scop., 1763)	*P. cespitalis* ([D. & S.], 1775)
Palpita vitrealis (Rossi, 1794)	*P. unionalis* (Hübn., 1796)
Idaea rusticata ([D. & S.], 1775)	*I. vulpinaria* (H.-S., 1851)
Cyclophora annularia (Fab., 1775)	*C. annulata* (Schulze, 1775)
Xanthoroe decoloraria (Esper, 1806)	*X. munitata* (Hübn., 1809)
Macaria alternata ([D. & S.], 1775)	*Semiothisa alternaria* (Hübn., 1799)
Ectropis similaria (Hufnagel, 1767)	*E. extersaria* (Hübn., 1799)
Epione vespertaria (L., 1767)	*E. paralellaria* ([D. & S.], 1775)
Hoplodrina octogenaria (Goeze, 1781)	*H. alsines* (Brahm, 1791)

*denotes species discussed in text

cases the original descriptions are not very clear and one cannot be sure which species was before the author, and their introduction is regrettable. John Bradley and Steve Fletcher, who have done so much formative work on the nomenclature of species known in Britain, were aware of many of these names and left them in oblivion for the sake of stability. Since they did not take formal action to get them suppressed we have had a succession of changes.

Goeze's name features many times: the work by Goeze (1783) gives scientific names to many species described by Geoffroy (1762), Réaumur (1734–42) and others before scientific names were introduced in their familiar form. The Latin diagnosis from the earlier work is quoted verbatim with the vernacular name although the

detailed description is simply referred to; this means that one has to study Geoffroy and Réaumur in order to see which species is meant. Many, but not all, of the descriptions are good and unmistakable. Goeze's work was regarded by Sherborn (1902) as not consistently binominal and therefore the names were not listed in his catalogue of names much used by taxonomists and consequently have often been overlooked but reintroduced in some Continental checklists.

Retzius's names present particular problems, since his use of binomens was not consistent and yet several of his names are well established. For example:

Hedya nubiferana (Haworth, 1811) formerly *H. dimidioalba* (Retzius, 1783)

The older name has been reintroduced in both the European and French checklists. Even though we cannot be sure which species was indicated he spelt the name *dimidio-alba*. The Code states that two names, whether separate or hyphenated, can be made into one if they describe one concept so long as the work is consistently binominal. This cannot be said of Retzius, which is presumably why this name is rejected, but *fusco-venosa* is in exactly the same position. Happily the new Code may be in force before anyone proposes further changes.

Those names marked with an asterisk in Table 1 deserve some mention:

Paraswammerdamia nebulella:

I have resisted this change since one cannot be sure from a brief description of one of the *Swammerdamia* group which species is implied. In addition Goeze names two species *nebulella*, the other being the same as the Denis & Schiffermüller species now in *Phycitodes* (Pyralidae). That made it a secondary junior homonym, but since *lutarea* (Haworth) was not described as a replacement name the name *nebulella* is still valid now that it is in a different genus. It has been used in Spanish, Austrian and French checklists and it is hard now to make a case for its suppression since it is the oldest name in the complex and has not recently been applied to another species, even though it would have been better left in oblivion.

Coleophora kuehnella:

The case against this change was argued by Emmet (1996a), but, according to the Code, description of an early stage is valid for nomenclatural purposes. In addition further senior synonyms are cited by Continental authors even though all of these could have been suppressed as *nomina oblita*.

Nymphula nitidulata

This is a name which Speidel even applied to the ICZN to have suppressed in favour of *stagnata* (Donovan), but he did not make this a separate submission and therefore it did not stand.

Misidentifications

Another reason for a name change is when there has been a misidentification. This can be confusing since one may identify a species correctly according to the reference work being used, but if the name was originally used by its author for a different species, then the original use has priority. This type of change often occurs when a

type specimen is re-examined. It can be overruled by application to the Commission for the sake of stability. There have been some disastrous instances in the Lepidoptera, worst of all the recent change of names in the genus *Abrostola*. When the types were re-examined it was found that the pins used by Linnaeus could be distinguished, and using this information it appeared that the labels had been moved around. For this reason the name *triplasia* (L., 1758) is back with the dark spectacle, and *tripartita* (Hufnagel, 1766) therefore has to be used for the spectacle.

Coleophora alcyonipennella (Kollar, 1832) formerly *C. frischella* (L., 1758)

The metallic green coleophorids have been much confused in the past as described by Emmet *et al.* (1996). What British entomologists were not aware of then was that *frischella* and *alcyonipennella* are both good species, and the genitalia figures in Patzak (1974) were transposed. As a result the description in Emmet (1996b) is of *alcyonipennella* whereas the genitalia figures are of *frischella*. It is quite possible that *frischella* could occur in Britain, but no specimens have been identified as yet. They cannot be separated by the antennae although there is a slight difference in wing colour. This species is not known to be double brooded. In order to make the position clear, the genitalia of both species are illustrated (Figs 1–4). The difference in the male is chiefly in the cornuti within the aedeagus, which are many and short in *frischella* and fewer and longer in *alcyonipennella*. In the females the ostial plate of *frischella* is much longer than that of *alcyonipennella*.

Reassessment of species

Most interesting are changes which come about on account of a reassessment of the status of species. When Linnaeus laid down his system of nomenclature a species was a clearly understood entity. Understanding of the evolution of species has made this less clear-cut and the nomenclature reflects the problems encountered.

Niditinea striolella (Matsumura, 1931) formerly *N. piercella* (Bentinck, 1935)

The eastern Palaearctic and western Palaearctic taxa were found by Petersen & Gaedike (1993) to be conspecific, therefore the senior name applies.

Phyllonorycter cerasicolella (H.-S., 1855) and *?P. spinicolella* (Zeller, 1846)

In Spanish, Austrian, French and European checklists this name has been listed in the synonymy of *P. spinicolella*, in each case on the recommendation of Dr Deschka (Austria). *P. spinicolella* feeds on blackthorn, *P. cerasicolella* on cherry, but the two are very similar. Pierce & Metcalfe (1935) describe differences in the genitalia, followed by Emmet *et al.* (1985) where also different distributions of the two taxa are given. This is an example of where the problems with the names reflect difficulties in determining the status of a taxon, especially where different food plants are involved.

In many cases it is well known that a species can use different food plants, and in some cases this causes a different appearance in the adult. The powdered quaker (*Orthosia gracilis*) is a good example; where larvae feed on bog myrtle (*Myrica gale*) the forewings of adults are reddish instead of the normal powdered whitish colour. When it comes to *Eupithecia denotata* the two forms on *Jasione* (sheep's-bit) and *Campanula* (bellflower) are assigned to different subspecies *jasioneata* and *denotata*, and they tend to occur in different places as determined by the plants. One of the most studied groups with different taxa associated with different plants is the *Yponomeuta padella* complex. After applying many sophisticated techniques,

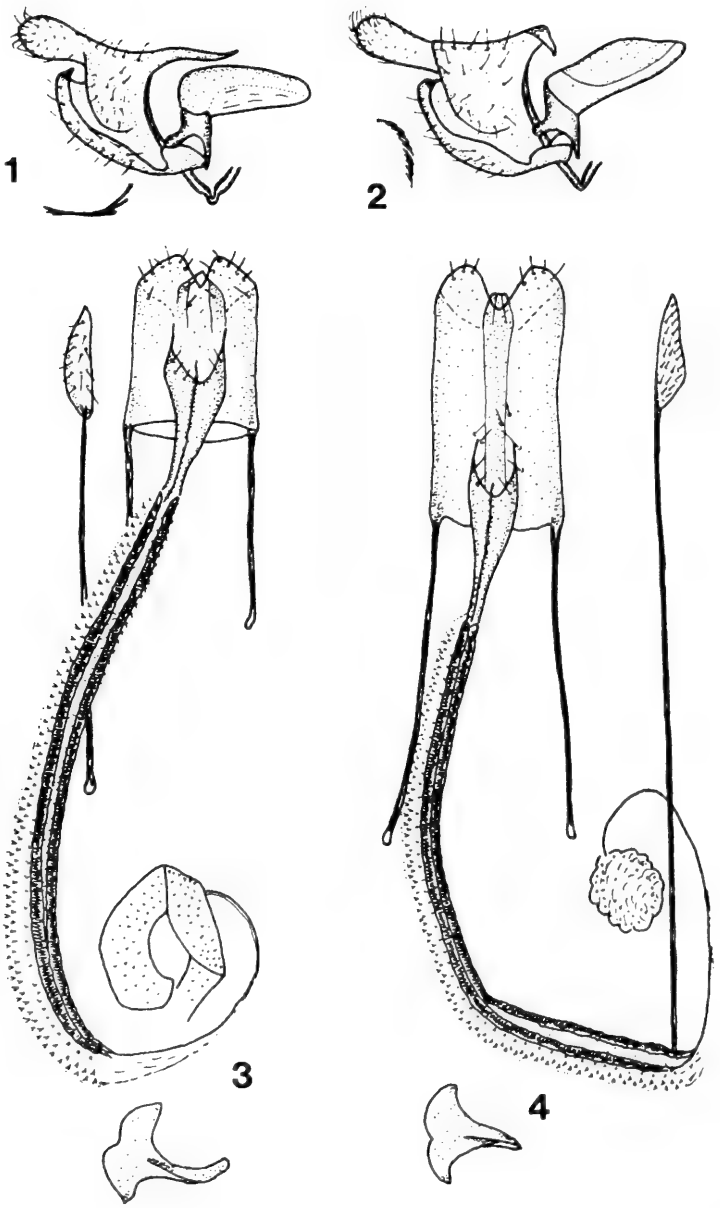


Fig. 1. *C. alcyonipennella* male genitalia; 2. *C. frischella* male genitalia; 3. *C. alcyonipennella* female genitalia; 4. *C. frischella* female genitalia, after Patzak (1974)

researchers in the Netherlands concluded that these taxa are still in the process of speciation. When should we assign different names in this continuous evolutionary process?

It is important to remind ourselves that the normal definition of a species is one which only breeds successfully with other members of the same species; hybrids occasionally happen but are seldom viable. Different species can usually be distinguished by structural characters separating them, although account must be made for variation. Taxonomists whose work is based primarily in museums may be unaware of the propensity or otherwise of species to interbreed, which must surely be more important than structural differences.

In Ireland Ken Bond has been researching into the 5th instar larvae of *Phyllonorycter* spp. and (pers. comm.) has found differences between larvae on cherry and blackthorn. It would be a valuable experiment if a microlepidopterist could overwinter mines from both blackthorn and cherry, and then sleeve half of the progeny on the opposite foodplant. The other half should be sleeved on the foodplant from which they come to act as a control. If a change of foodplant does not affect the survival of the species then the case for synonymy is proven.

Antispila treitschkiella (Fischer von Röslerstamm, 1843) formerly *A. petryi* Martini, 1898. I believe *petryi* was considered a distinct species, but is no longer.

Leucoptera wailesella (Stainton, 1858) = *laburnella* (Hübner, [1813])
Leucoptera orobi (Stainton, 1869) = *lathyrifoliella* (Stainton, 1865)

In his revision of the Lyonetiidae, Mey (1994) placed *wailesella* in synonymy on account of the lack of differences in the genitalia. The taxa look slightly different, and the remarks about different food plants apply. He also placed *orobi* in synonymy for the same reason.

Prays ruficeps (Heinemann, 1854)

This taxon I referred to in Emmet (1996b) as being of uncertain status. Since then the evidence for its being distinct from *fraxinella* (Bjerkander, 1784) has been growing. A paper I formerly overlooked by Chapman (1888) is of particular interest, although in some details it may not describe the whole picture.

Bembecia ichneumoniformis ([D. & S.], 1775) and *B. scopigera* (Scopoli, 1763)

Spatenka & Lastuvka (1990) showed that the species formerly known as *scopigera* is a complex of three species and ours is *ichneumoniformis*. One other species in this complex, *B. albanensis* (Rebel, 1918), presents a problem since there are two specimens of this species in the Prague museum labelled "Anglia", but confirmation is needed before this unlikely species could be included in the British fauna.

In the Pterophoridae there are a number of problems. The clearest one concerns *Pterophorus tridactyla* (L., 1758) and *P. tetradactyla* (L., 1758). Robinson & Nielsen (1983) examined the type material in the Linnaean collection and considered that the material labelled *tetradactyla* did not warrant type status since labels had been moved around, therefore they left *tetradactyla* in the synonymy of *tridactyla*. *P. tridactyla* was then used for a well known species on thyme, but in the British Isles there is a very similar scarcer species recorded from the Burren and Cornwall known most recently as *fuscolimbatus*. Arenberger examined the genitalia of the Linnaean *tridactyla* and found that it was identical with this latter species, and therefore our scarcer species takes that name, the former species having to be known by the next most senior name: *leucodactyla* ([D. & S], 1775). Then Gielis (1996) in

Microlepidoptera of Europe and an associated catalogue applied the name *tetradactyla* to *Platyptilia ochrodactyla* ([D. & S.], 1775), ignoring the opinion of Robinson & Nielsen. Now Leraut in the second edition of this French checklist has retained *tetradactyla* in the synonymy of *tridactyla*, even though it is now used for a different species. Consider what Tutt wrote in his monograph on the Pterophorina in 1890–92 "There is no mention of *ochrodactyla* for the Linnean description does not fit it. As a result I am applying to the ICZN to have the name *ochrodactyla* retained for the *Platyptilia* species and for *tetradactyla* to be suppressed".

The *Stenoptilia bipunctidactyla* complex present a notorious problem. I would hesitate to do more than follow the botanists' practice of referring to them as *bipunctidactyla* agg. until all aspects of their biology and taxonomy over a wide geographical area has been thoroughly researched.

Among the Macrolepidoptera the blood-vein, *Timandra griseata* Petersen, 1902, has been split into two species by Kaila (1995), the other species being named *comae* Schmidt, 1931. The type-species of *griseata* is not the taxon we know in Britain, and therefore our species becomes *comae*, although the status of this taxon is not beyond doubt as a distinct species.

Idaea vulpinaria (H.-S., 1851) had been thought distinct from *rusticata* ([D. & S.], 1775) but apparently that no longer holds, so the older name returns to our list.

Ectropis bistortata (Goeze, 1781) and *E. crepuscularia* ([D. & S.], 1775) have been regarded as two distinct taxa, the engrailed and the small engrailed, the latter being single-brooded and appearing between the broods of the former. In central Europe, from where both *bistortata* and *crepuscularia* were named, only one species is recognised, therefore these names are synonymous and *crepuscularia* has priority. That leaves our small engrailed (which form also occurs in other parts of northern Europe) without a name. If this can be proved a distinct species a new name may be needed, since all those in existence seem to be either first or second brood *crepuscularia*.

Noctua janthina ([D. & S.], 1775) was the name by which our lesser broad-bordered yellow underwing was known until it was found that two species were involved, *N. janthe* (Borkhausen, 1792) being the other. *N. janthe* is the species common in Britain although the other, which is slightly darker with a broader band of black encircling the yellow marking on the hindwing, could be found here. Although less common than *janthe* it does occur in near parts of the Continent.

This is probably an incomplete treatment of the changes which have recently come about, but I hope it makes a bit clearer why names have been changed, and raises hopes that eventually stability will be achieved.

Acknowledgements

My thanks are due to those who have provided information and advice, especially Ole Karsholt and Mark Parsons.

References

Chapman, T. A. 1888. Notes on *Prays curtisellus* and *rusticata*. *Entomologist's monthly magazine* **25**: 73–76.

Emmet, A. M., Watkinson, I. A. & Wilson, M. R. 1985. Gracillariidae. pp. 244–363. *In* Emmet, A. M. & Heath, J. (eds). *The Moths and Butterflies of Great Britain and Ireland* **2**: Harley, Colchester.

Emmet, A. M. 1991. Chart showing the life history and habits of the British Lepidoptera. *In* Emmet, A. M. & Heath, J. (eds). *The Moths and Butterflies of Great Britain and Ireland* **7**(2): 61–303. Harley, Colchester.

Emmet, A. M. 1996a. The identity of *Coleophora bernoulliella* (Goeze, 1783) and *C. kuehnella* (Goeze, 1783) (Lepidoptera, Coleophoridae). *Entomologist's Gazette*. **47**: 89–91.

Emmet, A. M. 1996b. Coleophoridae. *In* Emmet, A. M. (ed.). *The Moths and Butterflies of Great Britain and Ireland* **3**: Harley, Colchester.

Gielis, C. 1996. Pterophoridae. *In* P. Huemer, O. Karsholt & L. Lyneborg (eds). *Microlepidoptera of Europe* **1**: 1–222.

Geoffroy, E. L. 1762. *Histoire abrégée des Insectes qui se trouvent aux environs de Paris, etc* **1**: xxvii + 53 pp., pl. I–X; **2**: 690 pp, pl. XI–XXII.

Goeze, J. A. E. 1783. *Entomologische Beyträge zu des Ritter Linne zwölften Ausgabe des Natursystems*. **3**(2): 1–20, 1–78 pp. Leipzig.

ICZN, 1999. The International Code of Zoological Nomenclature. 4th edn. xx + 306 pp. London.

Kaila, L. 1994. The classification of the *Timandra griseata* group (Lepidoptera: Geometridae, Sterrhinae). *Entomologica Scandinavica* **25**: 461–479.

Karsholt, O., Kozlov, M. V. & Kristensen, N. P. 1994. *Eriocrania cicatricella* (Zetterstedt, 1839), the correct name of the moth currently known as *Eriocrania haworthi* Bradley, 1966 (Lepidoptera: Eriocraniidae) *Entomologiske Meddelelser* **62**: 91–93.

Karsholt, O. & Razowski, J. (eds) 1996. *The Lepidoptera of Europe, a distributional checklist*. 380 pp. Stenstup.

Mey, W. 1994. Taxonomische Bearbeitung der westpaläarctischen Arten der Gattung *Leucoptera* Hübner, [1825], *s.l.* (Lepidoptera, Lyonetiidae). *Deutsches entomologisches Zeitschrift (N:F:)* **41**: 173–234.

Patzak, H. 1974. Beiträge zur Insektenfauna der DDR: Lepidoptera Coleophoridae. *Beiträge zur Entomologie* **24**: 153–278.

Petersen, G. & Gaedike, R. 1993. Tineiden aus China und Japan aus der Hone-Sammlung des Museums Koenig (Lepidoptera: Tineidae). *Bonner zoologische Beiträge* **44**: 241–250.

Pierce, F. N. & Metcalfe J. W. 1935. *The genitalia of the tineid families of the Lepidoptera of the British Isles*, xxii, 116 pp., 34 pls. Oundle.

Réaumur, R. A. F. 1737. *Memoires pour servir l'Histoire des Insectes*. **3**: 1–531, pls. 1–47. Paris.

Robinson, G. S. & Nielsen, E. S. 1983. The Lepidoptera described by Linnaeus & Clerck. *Systematic Entomology* **8**: 191–242.

Sherborn, C. D. 1902. *Index Animalium, 1858–1800*. lix + 1195 pp. Cambridge.

Spatenka, K. & Lastuvka Z. 1990. Zur Taxonomie von *Bembecia scopigera* (Scopoli, 1763), *B. ichneumoniformis* ([Denis & Schiffermüller], 1775) und *B. albanensis* (Rebel, 1918) (Lepidoptera, Sesiidae). *Entomofauna* **11**: 109–121.

SHORT COMMUNICATION

First record of the cranefly *Dicranomyia* (*Dicranomyia*) *ventralis* (Schummel) (Diptera: Limoniidae) from Ireland—A single specimen of a strange *Dicranomyia* cranefly with reduced mouthparts was collected by one of us (P.A.) while sweeping for insects on the 15.ix.1991 at Woodlawn, Lough Sheelin, Co. Cavan (N471861). When the specimen was examined after mounting, it was identified as *Dicranomyia* (*Dicranomyia*) ?*ventralis* (Schummel) based on AMS key prepared by the senior author. The reason for the uncertain identification was because the ecological information available to us at the time of its discovery indicated that the species was a coastal species whereas the Irish specimen was collected along the shoreline of an inland freshwater lake which is about 60 km from the sea. Since then further information on the ecology has been published (Falk, 1991), which shows that apart from occurring in brackish coastal ditches amongst vegetation it also occurs at inland locations along sparsely vegetated margins of lakes and ponds. The specimen is a male and the details of the genitalia were later found to match the figure of this species illustrated in Geiger (1986).

D. (*D.*) *ventralis* is listed as a red data species in Falk (*op. cit.*) and regarded as a 'notable' species, the lesser of the four categories, based on the fact that it is only known from about 30 post 1960 sites in Britain. We have adopted the Falk (*op. cit.*) ranking of 'notable' for this species though in the earlier publication of Shirt (1987) it is ranked as 'Category 3 Rare'.

In Ashe *et al.* (1998), 40 species of the subfamily Limoniinae were listed for Ireland and the addition of *D.* (*D.*) *ventralis* raises this total to 41 compared to the 70 species recorded from Britain.

The species is widely distributed in the Palaearctic being recorded from most European countries including Russia, Ukraine and in the eastern Palaearctic is known from Afghanistan, Iran, Kyrgyzstan, North Korea and Asiatic Russia (Siberia) as well as the Oriental Region (India) (Savchenko *et al.*, 1992). The specimen has been presented to the National Museum of Ireland.—P. ASHE, Research Associate, Department of Zoology, University College, Belfield, Dublin 4; J. P. O'CONNOR, National Museum of Ireland, Kildare Street, Dublin 2, Ireland.

REFERENCES

Ashe, P., O'Connor, J. P., Chandler, P. J., Stubbs, A. E., Vane-Wright, R. I. & Blackith, R. E. 1998. The Craneflies (Diptera) of Ireland. Part 2. Limoniidae: Limoniinae. *Bulletin of the Irish Biogeographical Society* **22**: 102–127.

Falk, S. 1991. *A review of the scarce and threatened flies of Great Britain (Part 1)*. Nature Conservancy Council, Peterborough. Research and survey in nature conservation, No. 39, pp.1–194.

Geiger, W. 1986. Diptera Limoniidae 1: Limoniinae. *Insecta Helvetica, Fauna* **8**: 1–131.

Savchenko, E. N., Oosterbroek, P. & Starý, J. 1992. Family Limoniidae. In: Soós, Á. & Papp, L. (Eds), *Catalogue of Palaearctic Diptera*. Elsevier, Amsterdam/Akadémiai Kiadó, Budapest, Vol. 1, pp. 183–369.

Shirt, D. B. 1987. British red data books: 2. Insects. Nature Conservancy Council, Peterborough.

1999 ANNUAL EXHIBITION & DINNER

This short report is, in some ways, a return to older practice. Members usually have to wait a year (less if they are lucky) to read formal records of the previous year's exhibits. Council agreed that some less formal note should be prepared as soon after the event as possible, to be accompanied with some photographs. This should serve two purposes; first, it would give some flavour of the day for those who were not able to get to the exhibition and second, it would give an opportunity to make some comments on the collecting season just passed, the quality of the exhibition, and of the Dinner.

Despite the declining attendance and number of exhibits as detailed below, which, with the steadily increasing membership of the Society, is a worrying trend, the Society's exhibition remains a focal point of the year. It is, at best, an opportunity to meet old friends, meet new people, discuss entomology and look forward to the next season. Entomologists are nothing if not optimistic!

Thanks are due to all who make the Exhibition so enjoyable, but in particular to Mike Simmons, who not only organises the Exhibition but also the Annual Dinner.

Attendance

The Council agreed to set the date several weeks later than usual to allow members longer to prepare specimens after a busy field season. However, the later date has not increased numbers from those in 1998; 191 members and 49 visitors signed the book this year. This was less than 1998 when the numbers were 213 members and 68 visitors. The average attendance over the last twelve years is 202 members

Number of exhibits

At 145 the number of exhibits was the lowest recorded over the last twelve years and continues a trend of decline for the last three years. A rough count of the exhibitors notes when divided into the categories for reporting shows interesting comparisons with 1998, when the Exhibition was a month earlier. Not surprisingly, British Macrolepidoptera and Microlepidoptera represented most exhibits as usual, but with slightly less Microlepidoptera and slightly more Macrolepidoptera than in 1998. British butterfly exhibits were slightly down in number, as were Coleoptera. However, Hymenoptera and Foreign Lepidoptera had about the same number of exhibits. There were a few more Hemiptera this year – mostly Heteroptera – is this the start of a trend? The usual handful of exhibits of illustrations were produced but included a painting of L. Hugh Newman's house in Bexley, which would have brought back memories for some. If the majority of exhibits were in more or less the same proportions of each category as last year, the number of Diptera exhibits was less than last year – with about three-quarters the number shown in 1998. It is difficult to know what to make of these changes in the numbers of exhibits. If anyone has any ideas we would be pleased to hear them.

Exhibitors' notes

It is difficult to assess if the Editor's plea (sent with the Exhibition notice) for better quality notes to accompany exhibits has had any real effect. They still span the range from almost word perfect to the rather disappointing (to be polite).

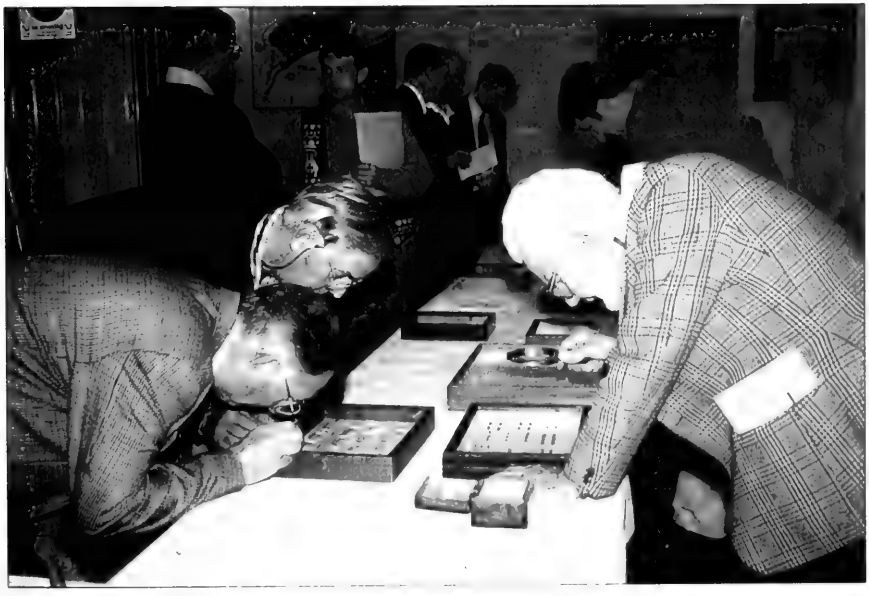
David Wilson preparing one of the colour plates of Lepidoptera.

Unfortunately there were still rather too many notes which mixed Micro and Macrolepidoptera and some even without names and addresses.

THE 1999 SEASON

If the number of exhibits was more or less the same as 1998—and with an extra month to prepare them —what about the actual insects? It was generally agreed—if any disagreement was possible that the season was poor. The good weather when it

Richard Jones examining some of the Coleoptera exhibits



Foreground, Dennis O'Keefe, John Langmaid and, right, Roy Softly concentrating on Lepidoptera.

did appear was too late to reverse the losses in the early part of the year. Of course our Exhibition cannot claim to give an overall picture of all insect groups across the country. The under-representation of some less-popular groups and the emphasis on new records and Lepidoptera varieties—remarkable that they are -is nevertheless not a complete barometer for the season. On the other hand the apparent lack of Lepidoptera suitable for photography may be one indication of the poor season. Despite the recorders scouring the Exhibition Hall it proved rather difficult to 'fill' the two exhibition photographic plates. The butterfly plate was completed but barely half a plate of moths was found.

THE IMPERIAL COLLEGE (IC) VENUE AND SOCIETY QUESTIONNAIRE

There have been a number of adverse comments in recent years about the Exhibition venue and particularly the cost and difficulty of car parking (especially for those wishing to bring exhibits). The majority do come by public transport—is this because of the car parking or because it is so easy to get to by public transport? Few other alternative venues have been suggested, including Kempton Park racecourse, used by the Amateur Entomologists' Society (AES).

This year, questionnaires were distributed on the day asking the simple questions. First, 'I am satisfied/dissatisfied with the present venue'. If dissatisfied an invitation was given to say why. Further questions disregarded the answer to the first question and asked about Kempton Park (the AES exhibition venue), and other venues in London or outside. Questionnaires were completed by 88 members and 1 visitor. 64 (72.7%) replied that they were satisfied with the present venue, 8 (9.1%) were satisfied with reservations and 16 (18.2%) were dissatisfied. While at first sight this appears to be a good vote for the IC venue, we must remember that over 100 of those present didn't bother to respond and over 600 members did not attend. Although the numbers attending has remained constant since IC was first used, the number of members has increased considerably. So in percentage terms attendance is declining.

In answer to the question 'Would you prefer Kempton Park', 36 replied YES, 49 replied NO and 3 did not know. Only 18 people answered the question about alternative venues and 14 of these favoured an alternative central London site.

For those who favour Kempton Park, it has to be pointed out that the cost of hiring that venue would be several times that of IC. The AES has to levy an admission charge (and have a large attendance) just to break even.

The dinner

49 members and guests attended the Annual Dinner, an increase in numbers on the previous year. It was generally thought that the meal was of excellent quality.

The exhibition in 2000

The Exhibition will be held on 11th November at Imperial College. Council has discussed the idea of a 'theme' to the Exhibition (to run alongside the regular exhibits). Several suggestions have been made, including "Garden entomology". More details will follow.

BENHS Council

SHORT COMMUNICATION

A bark beetle burrow-blocking against a chalcid parasitoid?—Whilst visiting "The Coombe", an ancient Chilterns woodland at Ivinghoe, Buckinghamshire, part of the National Trust's Ashridge Estate, on 25.vii.1997, I came across a specimen of the scolytid *Hylesinus crenatus* (Fab.) sitting just at the exit of its burrow, with the end of its elytra blocking the entrance hole. It was not long before I realized that the small ash tree housed many of the beetles, at least 15, all doing the same thing. Closer examination showed that a small chalcid was loitering near one of the holes (Fig. 1). Was the hole-blocking by the beetle related to the presence of this hymenopteron?

The chalcid was confidently identified from this photograph by R. R. Askew as *Entedon ergias* Walker (Eulophidae), a known parasitoid of certain bark beetles. The biology of *E. ergias* is well known and a paper by R. A. Beaver (1966; *Proceedings of the Royal Entomological Society of London A*, **41**: 37–41) details the life history and early stages. It is primarily recorded as an endoparasitoid of *Scolytus scolytus* (Fab.), laying its eggs on the beetle eggs inside the maternal gallery, but not completing its development until the beetle larva is well grown. It has also been recorded as a parasitoid of several other species of *Scolytus*, *Pityogenes*, *Phloeosinus* and *Hylurgops* (R. R. Askew, *pers. comm.*). It does not appear to have been recorded as being reared from *Hylesinus crenatus*, but this would seem a perfectly likely host.

Beaver comments that a female of *E. ergias* often waits at the entrance to a *Scolytus* gallery, until the beetle is occupied at the far end of the tunnel, when it nips in to lay its eggs. If the beetle returns, *Entedon* retreats out of the hole. I dug two specimens of *Hylesinus* out of their burrows, and as far as I remember, the transverse tunnels were 50–60 mm long, about the right length for completed galleries. At the time I didn't look for the beetles' eggs, so cannot be sure that their work was done. The question in the title of this short communication as to whether the beetles were deliberately blocking their burrows against the chalcid parasitoid must remain unanswered. It is possible that they were still in the process of tunnel-building (wood

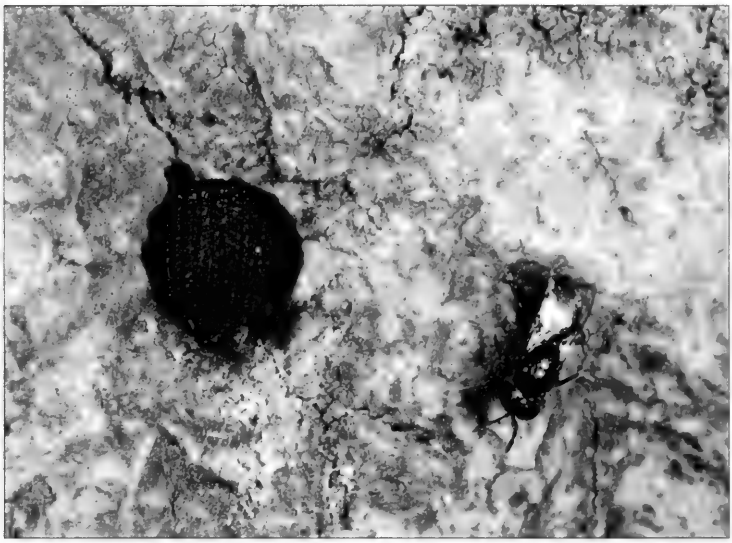


Fig. 1. Female *Hylesinus crenatus* apparently blocking her maternal burrow against the attentions of the chalcid parasitoid *Entedon ergias*.

chewings are visible below the entrance hole) and that the *Entedon* was waiting for its usual sneak opportunity to enter and lay eggs. But it seems strange that all 15 or so *Hylesinus* females were sitting in their entrances in exactly the same fashion at the precise time of my visit.

My grateful thanks go to R. R. Askew for the identity of and information on *Entedon*, to M. R. Shaw for helpful advice and to K. N. A. Alexander and G. Cannon of the National Trust for letting me loose in the Chilterns. RICHARD A. JONES, 135 Friern Road, East Dulwich, London SE22 0AZ.

THE ACTION FOR THREATENED MOTHS PROJECT

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HISTORICAL BACKGROUND

Butterfly Conservation (BC), a registered charity, was founded in 1968 as The British Butterfly Conservation Society. It now has a membership in excess of 8000 and is the largest invertebrate conservation society in Europe. Butterfly Conservation was set up with the aim of protecting our diminishing wild native butterflies and moths from destruction of habitat and other threats. The Society is lobbying continuously for a transformation in our attitudes to the countryside and its wildlife. The Society was entirely managed and run by volunteers until 1990 when an administration headquarters was set up. In 1993 the first full-time Conservation Officer was employed. The society now has over 15 staff and several contractors working on projects relating to Lepidoptera conservation.

Moths have always been included in the remit of BC, but until recently their profile was comparatively low within the Society. In 1993 BC contributed towards the National Moth Conservation Project, a tangible contribution that has continued to this day. The Society has contributed funds to several moth projects, including work on the bright wave *Idaea ochrata*, the marsh mallow *Hydraecia osseola*, the speckled footman *Coscinia cribraria* and the small dotted footman *Pelosia obtusa*, and funded an international conference on burnet moths. A number of regional workshops on moths have been organised for branches and there have been a wide range of moth related events held by the branches, e.g. several hundred moth trapping evenings. In 1999 the Society employed M. Parsons and D. Green on a full time basis with funding from English Nature (EN) and BC, along with P. Waring (PW) in an advisory role, to work on the Action for Threatened Moths Project and the National Recording Scheme for the Rarer British Macro-moths.

THE NATIONAL MOTH CONSERVATION PROJECT AND THE NATIONAL RECORDING SCHEME FOR THE RARER BRITISH MACROMOTHS

The National Moth Conservation Project was launched in 1987 by the former Nature Conservancy Council. This project has been operated by PW since its inception and includes work on species on Schedule 5 of the Wildlife & Countryside Act. There are several aims for this project. These include the formation and operation of a national information gathering network; to provide feedback to recorders; and to produce national distribution maps, particularly for the scarce and threatened species. This enables the regular assessment and revision of the conservation status of our scarce and threatened species. In 1990/91, the National Recording Scheme for the Rarer British Macro-moths was formed as part of the project by linking up existing County Moth Recorders and finding recorders for poorly covered areas. Further details and a resumé of the history of the project are given in Waring (1998 & 1999a). It is expected that the National Recording Scheme

for the Rarer British Macro-moths will be integrated within the Action for Threatened Moths Project. This will provide a single point of contact and maximise the use of the data provided by contributors. Contributors will be informed of any change when it occurs. Ten annual news bulletins have been produced by the National Moth Conservation Project and sent to all County Moth Recorders. It is anticipated that future annual newsletters will be produced covering the National Moth Conservation Project, the National Recording Scheme for the Rarer British Macro-moths and the Action for Threatened Moths Project continuing PW's precedent.

BUTTERFLY CONSERVATION'S BRANCH MOTH OFFICERS AND THE COUNTY MOTH RECORDERS

Many of the current County Moth Recorders were individuals already working on county lists or providing some focal point for recording in a given county. The BC Branch Moth Officer post is relatively new. These started to be formally recognised and appointments made in 1994. *News bulletin 10* of the National Moth Conservation Project (Waring, 1999b & c) lists all the BC Branch Moth Officers and the County Moth Recorders. The role of the BC Branch Moth Officer is broadly to co-ordinate moth issues within the Branch and to promote moth recording and organise local events. This should involve forming and developing links with the County Moth Recorder and ensuring that all records of scarce or threatened moths from the Branch are forwarded to the National Recording Scheme for the Rarer British Macro-moths. Fuller details of the roles of BC Branch Moth Officers are given in Waring (1997). Branch Moth Officers and all other contributors are encouraged to send all records via the County Moth Recorder. In a number of cases the County Moth Recorder is also the Branch Moth Officer.

THE UK BIODIVERSITY ACTION PLAN AND THE ACTION FOR THREATENED MOTHS PROJECT

In response to the commitment given by the Prime Minister in signing the Convention on Biological Diversity at the Earth Summit in Rio de Janeiro in 1992, the UK Government published *Biodiversity: The UK Action Plan* (UK Biodiversity Group, 1994). In discharging our obligations under the Biodiversity Convention, the UK Action Plan set as an overall goal: "To conserve and enhance biological diversity within the UK and to contribute to the conservation of global biodiversity through all appropriate mechanisms". A Biodiversity Steering Group was established to advise government and to assist with work on biodiversity. In 1995 Volumes 1 and 2 of *Biodiversity: The UK Steering Group Report* (UK Biodiversity Group, 1995a & 1995b) were published. Volume 2 gave the Short, Middle and Long List of species being considered by the plan (this has since been amended) and included the Action Plans for three moths: the speckled footman *Coscinia cribraria*, netted carpet *Eustroma reticulatum* and the bright wave *Idaea ochrata*. Further Action Plans were published in UK Biodiversity Group (1999a,b). The preparation of all these documents drew heavily on the information collected by the National Moth Conservation Project.

There are a number of criteria, not all appropriate to moths, by which a species can qualify to be treated under the Biodiversity Action Plan (BAP). Although not comprehensive, the following criteria provide an indication of how the species were selected (after UK Biodiversity Group, 1995a).

- Threatened endemic and other globally threatened species;
- Species where the UK has more than 25% of the world or appropriate biogeographical population;
- Species where numbers or range have declined by more than 25% in the last 25 years;
- In some instances where the species is found in fewer than 15 10 km squares in the UK;
- Species which are listed in the EU Birds or Habitats Directives, the Bern, Bonn or CITES Conventions, or under the Wildlife and Countryside Act 1981 the Nature Conservation and Amenity Lands (Northern Ireland) Order 1985.

A summary of the Convention on Biological Diversity and how BC is working with a variety of partners within the framework of the convention is given by Bourn & Warren (1997).

The species in Table 1 are those covered by the BAP. In this species are covered by either a Priority Species Action Plan or a Species Statement. The Species Action Plans detail current status, current factors causing loss or decline, current action, objectives and targets and a range of proposed actions. The Species Statements are similar but under proposed action typically recommend monitoring only. For the purposes of the Action for Threatened Moths Project, the Species Action Plans and Statements are both treated equally. BC has agreed to be the Lead Partner for the projects on all but one of the priority moths and butterflies, sometimes in association with a statutory agency (e.g. EN) or a non-government organization (NGO) (e.g. the National Trust). It should be noted that several species covered by Schedule 5 of the Wildlife & Countryside Act are not included in this list. Work is expected to continue on these species under the Species Recovery Programme funded by EN or as projects of the Countryside Council for Wales (CCW) or Scottish Natural Heritage (SNH).

Prior to the publication of the majority of these Action Plans, BC started to produce a series of Regional Action Plans to identify regional priorities and draw together local information on priority butterflies and moths. Those already produced include Northern Ireland, Wales, West Midlands and North East England. These all include priorities for moth conservation in the regions, including many species that do not have a national Species Action Plan, and in many cases include details of ecology, distribution and actions necessary for their conservation. Implementing these plans is a major challenge for the Society, which will be aided by the Action for Threatened Moths Project.

The work undertaken within the Action for Threatened Moths Project is guided by a Steering Committee, currently made up with representatives of BC, the country agencies (i.e. EN, CCW, SNH and the JNCC) along with moth specialists. The main rationale behind the Project is to provide a co-ordinated approach to the conservation of the BAP moths and to increase the involvement of volunteers and other organisations in priority moth work. Initial work has included contacting all County Moth Recorders, county moth groups and BC Branch Moth Officers to inform them of the project. Some individuals have been contacted in order to encourage participation in preliminary survey work and new sites have already been discovered for several priority species.

The future

The project aims to ensure that annual monitoring will be undertaken at key sites for most, if not all, of the BAP species. This may take the form of modified transects

Table 1: Species covered by the Biodiversity Action Plan

Species	English Name	Priority Species Action Plan	Species Statement	Lead Partner
†*Acosmetia caliginosa* (Hübn.)	reddish buff	+		BC
Aspitates gilvaria (D. & S.)	straw belle	+		BC
Athetis pallustris (Hübn.)	marsh moth	+		BC
Calophasia lunula (Hüfn.)	toadflax brocade		+	BC
Catocala promissa (D. & S.)	light crimson underwing	+		BC
Catocala sponsa (L.)	dark crimson underwing	+		BC
Coleophora tricolor Walsingham	basil thyme case-bearer	+		BC
Coscinia cribraria (L.)	speckled footman	+		BC
Cosmia diffinis (L.)	white-spotted pinion	+		BC
Cyclophora pendularia (Clerck)	dingy mocha	+		BC
Dicycla oo (L.)	heart moth	+		BC
Epione vespertaria (L.) (= *paralellaria*) (D. & S.)	dark bordered beauty	+		BC/ RSPB
Eustroma reticulatum (D. & S.)	netted carpet	+		BC/NT
Hadena albimacula (Borkhausen)	white spot		+	BC
Heliophobus reticulata marginosa (Haw.)	bordered gothic	+		BC
Hemaris tityus (L.)	narrow-bordered bee hawk-moth	+		BC
Hydrelia sylvata (D. & S.)	waved carpet	+		BC
Hydraecia osseola hucherardi Mabille	marsh mallow		+	BC
Hypena rostralis (L.)	buttoned snout	+		BC
Idaea dilutaria (Hübn.)	silky wave	+		BC
Idaea ochrata (Scop.)	bright wave	+		BC
Jodia croceago (D. & S.)	orange upperwing	+		BC
Lycia zonaria britannica (Harrison)	belted beauty	+		BC
Lygephila craccae (D. & S.)	scarce blackneck		+	BC
Macaria carbonaria (Clerck)	netted mountain moth	+		BC
Minoa murinata (Scop.)	drab looper		+	BC
Moma alpium (Osbeck)	scarce merveille du jour		+	BC
Mythimna turca (L.)	double line	+		BC
Noctua orbona Hüfn.)	lunar yellow underwing	+		BC
Oria musculosa (Hübn)	brighton wainscot	+		BC
Paracolax tristalis (Fab.) (= *derivalis* (Hübn.))	clay fan-foot		+	BC
Paradiarisa sobrina (Dup.)	cousin german		+	BC

(*Continued*)

Table 1. (*Continued*)

Species	English Name	Priority Species Action Plan	Species Statement	Lead Partner
†*Pareulype berberata* (D. & S.)	barberry carpet	+		BC
Pechipogo strigilata (L.)	common fan-foot	+		BC
Phyllodesma ilicifolia (L.)	small lappet		+	BC
Polia bombycina (Hufn.)	pale shining brown	+		BC
Polymixis xanthomista (Hübn.)	black-banded		+	BC
†*Pyropteron chrysidiformis* (Esper)	fiery clearwing	+		BC/EN
Rheumaptera hastata (L.)	argent & sable	+		BC
Schrankia taenialis (Hübn.)	white-line snout		+	BC
Scotopteryx bipunctaria (D. & S.)	chalk carpet		+	BC
Shargacucullia lychnitis (Rambur)	striped lychnis	+		BC
Siona lineata (Scop.)	black-veined moth	+		BC
†*Thetidia smaragdaria maritima* (Prout)	essex emerald		+	BC
Trichopteryx polycommata (D. & S.)	barred tooth-striped	+		BC
Trisateles emortualis (D. & S.)	olive crescent		+	BC
Tyta luctuosa (D. & S.)	four-spotted		+	BC
Xestia alpicola alpina (Humphreys & Westwood)	northern dart		+	BC
Xestia ashworthii (Doubleday)	ashworth's rustic		+	BC
Xestia rhomboidea (Esper)	square-spotted clay	+		BC
Xylena exsoleta (L.)	sword-grass	+		BC
Zygaena loti scotica (Rowland-Brown)	slender scotch burnet	+		BC
†*Zygaena viciae argyllensis* Tremewan	new forest burnet	+		SNH

Key: BC Butterfly Conservation; EN English Nature; NT National Trust; RSPB Royal Society for the Protection of Birds; SNH Scottish Natural Heritage; †Wildlife and Countryside Act species

after Pollard (1977), Spalding (1997) and Birkinshaw & Thomas (1999), thorough light trapping or by larval surveys. This monitoring, however, will depend primarily on volunteer effort and future funding for specific work. Further surveys will also take place aimed at understanding the distribution of individual species and identifying priorities for further effort. In some cases extensive autecological research may be needed and substantial additional funds will be required. Fund-raising is thus a vital part of our role in conjunction with specialist staff within BC.

Practical conservation measures are expected to be implemented for many of the BAP species, though in some cases our understanding of an individual species' ecology will need to improve before any measures can be put in place. Part of the

process will be to ensure that the local teams of the conservation agencies and land owners are aware of the presence of BAP species.

As is inherent in the BAP process, review of the current list of species will be ongoing. If it becomes obvious that other species have been overlooked and are in need of conservation effort, particularly if they meet the aforementioned criteria, an Action Plan will be drafted and effort made for it to be implemented. With the increase in interest and the publication of a number of key works, such as *The Moths and Butterflies of Great Britain and Ireland* series, the knowledge of the so-called micro-lepidoptera is such that conservation of some may benefit from the formulation and implementation of Action Plans. With an active scheme such as the Pyralid & Plume Recording Scheme run by Tony Davis and the existence of a national review (Parsons 1993), it is comparatively straightforward to identify several species of pyralid moth that are candidates for this approach. It may not be quite so straightforward to identify other candidate species, but if other species reviews are undertaken this task should get easier. In the meantime certain species suggest themselves through habitat concerns, e.g. *Coleophora vibicella* on dyer's greenweed *Genista tinctoria* and *C. ochrea* on common rock-rose *Helianthemum nummularium* growing in exposed situations.

The Council of BC has recently revised the Society's Reserve Acquisition Strategy. Potential reserves will have to meet various criteria, including safeguarding the wildlife interest (for example, land becoming available and threatened through a change in management), education opportunities and location. As opportunities arise, reserves may be established and purchased primarily for their moth interest.

It is expected that increasing use will be made of computer technology, but this will not exclude any individuals from contributing to any aspect of the project. For example, we have been trialing a weekly newsletter sent out via e:mail to surveyors aimed particularly at increasing the recording of the BAP species. It is anticipated that there will be an increased use of e:mail for correspondence (our e:mail addresses are mparsons/*a* butterfly-conservation.org and dgreen/*a* butterfly-conservation.org).

How you can help

Various surveys and monitoring projects are planned and we need volunteers to undertake aspects of these. In the future there may be also the opportunity to become involved with some more intensive autecological work. In the meantime, recording under-worked areas can result in unexpected finds, which can add considerably to our knowledge of individual species. Please ensure that all records are forwarded to the County Moth Recorder, from whom all relevant records should be forwarded to us for future incorporation into the National Recording Scheme for the Rarer British Macro-moths. We hope that surveys for BAP species can be organised and promoted at a local level, for example by the BC Branch Moth Officer or the County Moth Recorder. Obviously, the more people that participate in these surveys then the more comprehensive the results.

It is hoped that this process will also bring Societies such as BC and the British Entomological & Natural History Society and the local BC Branches and the various moth or invertebrate groups into much closer contact and, perhaps, co-operation with individual projects. This will undoubtedly have benefits for all concerned and for moth conservation.

If you have any comments on any aspect of this article or the project we would be pleased to hear from you.

Acknowledgements

We would like to take the opportunity to thank Martin Warren, Nigel Bourn, David Bridges and Roger Smith for useful comments on earlier drafts of the text.

References

Birkinshaw, N. & Thomas, C.D. 1999. Torch-light transect surveys for moths. *Journal of Insect Conservation*, **3**: 15–24.

Bourn, N. & Warren, M. 1997.The road from Rio: Conservation action for the UK's priority butterflies. *Butterfly Conservation News*, No. 65: 7–9.

Parsons, M.S. 1993. *A review of the scarce and threatened pyralid moths of Great Britain*. Joint Nature Conservation Committee, Peterborough. (UK Nature Conservation No. 11).

Pollard, E. 1977. A method for assessing changes in the abundance of butterflies. *Biological Conservation*, **12**: 115–134.

Spalding, A. 1997. The use of the butterfly transect method for the study of the nocturnal moth *Luperina nickerlii leechi* Goater (Lepidoptera: Noctuidae) and its possible application to other species. *Biological Conservation*, **80**: 147–152.

UK Biodiversity Group, 1994. *Biodiversity. The UK Action Plan*. HMSO, London.

UK Biodiversity Group, 1995a. *Biodiversity: The UK Steering Group Report. Volume 1: Meeting the Rio Challenge*. HMSO, London.

UK Biodiversity Group, 1995b. *Biodiversity: The UK Steering Group Report. Volume 2: Action Plans*. HMSO, London.

UK Biodiversity Group, 1999a. *UK Biodiversity Group. Tranche 2 Action Plans. Volume IV—invertebrates*. English Nature, Peterborough.

UK Biodiversity Group, 1999b. *UK Biodiversity Group. Tranche 2 Action Plans. Volume VI—terrestrial and freshwater species and habitats*. English Nature, Peterborough.

Waring, P. 1997. The main roles of the Butterfly Conservation Branch Moth Officers. National Moth Conservation Project. *News bulletin*, **8**: 7–8.

Waring, P. 1998. A resume of the history, operation and products of the work of the National Recording Network for the Rarer British Macro-Moths and ideas on developments for the future. National Moth Conservation Project. *News bulletin*, **9**: 7–12.

Waring, P. 1999a. The National Recording Network for the Rarer British Macro-moths. *Atropos*, **6**: 19–27.

Waring, P. 1999b. Directory to the names and addresses of the County Moth Recorders. National Moth Conservation Project. *News bulletin*, **10**: [33]–[36].

Waring, P. 1999c. An up-dated directory to the names and addresses of Butterfly Conservation's Branch Moth Officers. National Moth Conservation Project. *News bulletin*, **10**: [36]–[38].

BUTTERFLY CONSERVATION—ACTION FOR THREATENED MOTHS PROJECT

AN OPPORTUNITY FOR PARTICIPATION BY BENHS MEMBERS

The Butterfly Conservation Project

Butterfly Conservation (BC) are undertaking a major new project which will concentrate conservation action on the UK's most threatened moth species. This project is in part grant-aided by English Nature (EN).

Fifty-three threatened species have been identified within the UK Biodiversity Group's Action Plans published by the Government. These species are listed at the end of this article. For all but one of these, BC is the Lead Partner. Lead Partners have conservation expertise and provide guidance in carrying out the work programme as defined by the Action Plan. They may carry out the work themselves or with others. They administer the work, manage the resources and report the results.

The aims of the project include monitoring the populations of these species (for some, it may first be necessary to establish that the species is still present) and carrying out autecological studies with a view to identifying habitat requirements and conservation action. This project will require the participation of volunteers from outside BC and the co-operation of other entomological organisations. It is hoped that the project will provide a co-ordinated approach to the conservation of these threatened species.

The project will be run by two full-time Moth Conservation Officers, Mark Parsons and David Green, based at BC's UK Conservation Office at Wareham, Dorset. In addition Paul Waring will be a major advisor with further advice being provided by a Steering Group of experts including David Sheppard (EN), Phil Sterling (Dorset County Council) and Adrian Spalding.

THE BENHS INVOLVEMENT

The membership of the BENHS includes virtually all the leading field lepidopterists in the UK and whose in-depth expertise is second to none. It has always been the view of the Society's Conservation Working Group (CWG) that the Society, as befits its position in the entomological world, should be more involved in practical conservation. The major obstruction to this concept has always been the lack of any full-time paid employees; the running of the Society being totally dependent upon volunteer labour.

The CWG believes that the BC project is an ideal opportunity for members to contribute to moth conservation in the UK and to undertake voluntary fieldwork in order to assist in the delivery of the Biodiversity Action Plans.

There are two ways in which BENHS members can help:

1. Monitoring

Volunteers are required to visit key sites for the listed species on an annual basis in order to ascertain the status and/or presence or absence of the individual species. Usually this survey work will be in the form of light-trapping, though in some circumstances, e.g. Toadflax Brocade, it is more desirable that larval counts are undertaken. Results from this recording work will be forwarded to a member of the CWG for collation. This person will prepare an annual review which will be published in the Society's *Journal* and be tangible evidence of the Society's contribution to the Biodiversity Action Plan (BAP) process, and will also forward the raw data to the moth officers at BC for inclusion in the overall process.

If you are willing to monitor an individual (or more) species please could you send us your name, address, phone number, which species you are willing to monitor, the site you have in mind (this should be a site where the species is regularly recorded, preferably in numbers, or should be a site at the edge of its range. BC's moth officers can provide advice on key sites if required) and the method you intend to use, e.g.

light-trapping, timed counts etc. It would be useful, but not essential, if fixed point photographs could be taken annually to ascertain any habitat change.

2. Species autecology

The BENHS also hopes to be able to take the lead in investigating the requirements of two specific species, one with a restricted distribution and one which is comparatively widespread. The species proposed are the Brighton Wainscot and the Barred Tooth-striped. In each of these cases it is hoped that members of the Society would be involved in survey work, monitoring and investigations into the autecology aimed at identifying the habitat requirements for the species. We would like to hear from an individual who would be interested in co-ordinating work on the Barred Tooth-striped (John Phillips has volunteered to co-ordinate the Brighton Wainscot) and from others who would be interested in assisting with these projects. Again please send us names, addresses etc. and aspects of the project that you are interested in.

Newsletter

If you are on e-mail and would like to receive a roughly weekly e-mail newsletter relating to work on the BAP moths please include your e-mail address with your details. The BC moth officers compile this newsletter which is circulated during the field season and generally summarises which BAP species have been flying and in which part of the country in the previous few days. It is primarily aimed at increasing recording, particularly of the BAP species.

UK Biodiversity Action Plan—priority moth species

Acosmetia caliginosa reddish buff
**Aspitates gilvaria* straw belle
**Athetis pallustris* marsh moth
**Calophasia lunula* toadflax brocade
**Catocala promissa* light crimson underwing
**Catocala sponsa* dark crimson underwing
Coleophora tricolor basil thyme case-bearer
Coscinia cribraria speckled footman
**Cosmia diffinis* white-spotted pinion
**Cyclophora pendularia* dingy mocha
**Dicycla oo* heart moth
**Epione vespertaria* dark bordered beauty
Eustroma reticulatum netted carpet
**Hadena albimacula* white spot
**Heliophobius reticulata* bordered gothic
**Hemaris tityus* narrow-bordered bee hawk-moth
**Hydraecia osseola hucherardi* marsh mallow moth
**Hydrelia sylvata* waved carpet
**Hypena rostralis* buttoned snout
Idaea dilutaria silky wave
Idaea ochrata bright wave
Jodia croceago orange upperwing
**Lycia zonaria britannica* belted beauty

**Lygephila craccae* scarce blackneck
**Macaria carbonaria* netted mountain moth
**Minoa murinata* drab looper
**Moma alpium* scarce merveille du jour
**Mythimna turca* double line
**Noctua orbona* lunar yellow underwing
**Oria musculosa* Brighton wainscot
**Paracolax tristalis* clay fan-foot
**Paradiarsia sobrina* cousin German
Pareulype berberata barberry carpet
**Pechipogo strigilata* common fan-foot
Phyllodesma ilicifolia small lappet
**Polia bombycina* pale shining brown
**Polymixis xanthomista* black-banded
Pyropteron chrysidiformis fiery clearwing
**Rheumaptera hastata* argent & sable
**Schrankia taenialis* white-line snout
**Scotopteryx bipunctaria* chalk carpet
**Shargacucullia lychnitis* striped lychnis
Siona lineata black-veined moth
Thetidia smaragdaria maritima Essex emerald
**Trichopteryx polycommata* barred tooth-striped
Trisateles emortualis olive crescent
Tyta luctuosa four-spotted
**Xestia alpicola alpina* northern dart
**Xestia ashworthii* ashworth's rustic
**Xestia rhomboidea* square-spotted clay
**Xylena exsoleta* sword grass
Zygaena loti scotica slender scotch burnet
Zygaena viciae argyllensis New Forest burnet

There are several projects already under way and those species without an asterisk (*) are already subject to studies or are considered not to require any monitoring. Those species indicated by * require populations to be monitored and volunteers are sought. Some projects are already under way on some of these species in part of their range, but further coverage is needed. It should be reiterated here that sites selected for monitoring should be representative of the range of a given species in the UK.

Please send your details and any enquiries to:

BENHS Conservation Working Group,
c/o John Phillips
"Maytime"
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PO11 0RT Tel: 01705 460437

SHORT COMMUNICATIONS

Some records of *Macrosteles quadripunctulatus* (Kirschbaum) (Hemiptera: Cicadellidae)—*M. quadripunctulatus* is a species of rather infrequent and sporadic occurrence in Britain. Le Quesne (1969) was able to give only a single locality for it: Braunton Burrows, Devon. There have since been a number of additional records from southern England, and it has become clear that the species can live in a range of dry habitats, the important requirements for the species being low, often sparse vegetation on a dry and well-drained substratum (Kirby, 1992). The following summary of my own recent captures of this insect gives further details of localities, adds further localities and counties to those reported in Kirby (1992) and exemplifies some of its known habitats.

Murston, East Kent (TQ9266), 2.ix.1984, exact circumstances of capture unknown, three specimens found amongst a mixed bag collected from a rather wide area including dry grassland and ruderal vegetation;

Kew, Surrey (TQ2076), 9.ix.1984, a single male collected from sparse low vegetation on a small area of waste ground largely surfaced with fine gravel—though only a single specimen was taken owing to lack of suitable equipment, *Macrosteles*, any or all of which could have been *M. quadripunctulatus*, were common over an area of several square metres, along with the Heteroptera *Chlamydatus pullus* (Reuter), *C. saltitans* (Fallén) (Miridae) and *Saldula orthochila* (Fieber) (Saldidae), amongst vegetation consisting in large measure of small plants of *Trifolium repens* L. and low grasses, growing to a height of a few centimetres at most and giving only about 50% ground cover;

Brancaster, West Norfolk, TF765449, 7.ix.1991, a single specimen taken by sweeping sparse grassy vegetation behind the fore-dunes, at a transition to sandy saltmarsh;

Snettisham, West Norfolk, TF658337, 7.ix.1991, two specimens found by sweeping dry grassland on a bank of coastal shingle;

Sandy Heath, Bedfordshire, TL204492, 15.ix.1996. Common amongst very sparse grasses in the base of a sand quarry;

Collyweston Quarries, Northamptonshire, TF003037, 12.ix.1990, a single male taken, along with many *M. laevis* (Ribaut), by sweeping very low sparse vegetation consisting mostly of small Fabaceae and fine grasses in a recently disturbed area on oolitic limestone, just beyond the boundary of a Trust reserve and SSSI;

Maxey South Pits, Northamptonshire, TF126073, 9.viii.1992, frequent amongst sparse grassland and ruderal vegetation on level, recently disturbed, well-drained ground beside recently disused gravel working;

Thornhaugh Quarry, Northamptonshire, TF047002, 10.viii.1992, common on sparsely vegetated limestone at the top of a disused quarry;

Kingsbury, Warwickshire, SP218986, 18.viii.1998, frequent amongst very sparse grasses on a sandstone ledge in a quarry.

It seems rather clear that *Macrosteles quadripunctulatus* has a wide distribution in southern England, that though it has some fairly specific habitat requirements these can be brought about by disturbance or harsh conditions in quite a wide range of habitat types, including recent ones of human origin, that quite small areas of suitable habitat are able to support colonies, and that it is probably a rapid colonist. The species is accorded the status of Notable A in Kirby (1992), a status necessitating the occurrence of the species in no more than 30 ten-kilometre squares of the

National Grid in Britain. This status is evidently inappropriate in the light of recent records; in reality, it is probably no more than local.—P. KIRBY, 21 Grafton Avenue, Netherton, Peterborough PE3 9PD.

REFERENCES

Kirby, P. 1992. *A review of the scarce and threatened Hemiptera of Great Britain*. Joint Nature Conservation Committee, Peterborough (UK Nature Conversation, no. 2).

Le Quesne, W. J. 1969. Hemiptera, Cicadomorpha, Deltocephalinae. *Handbooks for the Identification of British Insects* **2(2b)**.

***Gastrallus immarginatus* (Müller, P. W. J.) (Col.: Anobiidae) in Gloucestershire**—Ever since the discovery of a major wood-decay beetle fauna on the Cotswold outlier of Bredon Hill in Worcestershire (Mendel, 1992, 1996; Whitehead, 1996) I have been exploring similar habitat along the Cotswold scarp with the expectation of finding a similar fauna. The discovery of *Ampedus rufipennis* (Stephens) at its first Gloucestershire site is reported elsewhere (Alexander, 1999), and I have now found *Gastrallus*. It is likely, too, that *Limoniscus violaceus* (Müller, P. W. J.) will be found in the county. The characteristic tiny exit holes of *Gastrallus* were noted in clusters in trunk bark on an old open-grown field maple, 22.xi.1998, in the parish of Prescott (SO990290). The tree had a well-lit trunk, a noticeable feature of the *Gastrallus* trees on Bredon Hill.—KEITH N. A. ALEXANDER, 14 Partridge Way, Cirencester, Gloucestershire GL7 1BQ.

REFERENCES

Alexander, K. N. A. 1999. *Ampedus rufipennis* (Stephens) (Elateridae) new to Gloucestershire. *Coleopterist*, **8** (1): 1–6.

Mendel, H. 1992. *Limoniscus violaceus* (Elateridae) Müller at Bredon Hill, N. N. R., Worcestershire. *Coleopterist* **1** (2): 5.

Mendel, H. 1996. *Gastrallus immarginatus* (Müller, P. W. J.) (Anobiidae); a second British locality. *Coleopterist* **4** (3): 86–87.

Whitehead, P. F. 1996. The notable arboreal Coleoptera of Bredon Hill, Worcestershire, England. *Coleopterist* **5** (2): 45–53.

Two unusual records of Tortricidae (Lepidoptera) from Essex.—Recently Mr Brian Goodey, via Mr Ben Fisher, submitted to me for identification two specimens of Tortricidae which had been collected in different localities in north Essex (VC19). They proved to be of unusual interest and so I venture to give details and comments on them below. The specimens and genitalia slide preparations are in Mr Goodey's collection.

Cydia illutana (H.-S.). 1 ♀, Coggeshall, 31.v.1997, B. Goodey. The locality lies within the grounds of an old manor-house and comprises a deer-park and arboretum. The latter contains a wide range of specimen trees including a stand of European larch (*Larix decidua*), the assumed hostplant. *C. illutana* is very poorly known in the U.K. and apparently has not been recorded from Essex before. It has proved difficult to find a good published illustration of the female genitalia of this species and so the opportunity is taken here to figure this example (Fig. 1; one apophysis omitted). The genitalia are similar to those of *C. conicolana* (Heylaerts) (figured by Bradley *et al.*, 1979, page 253) but the genital plate is more distinctly sub-rectangular, the colliculum is longer and more distinctly sclerotized, and the signa are larger and longer.

Celypha arbutella (L.). 1 ♂, Dovercourt, 7.viii.1997, C. Gibson. In the British Isles this species is typically found in northern locations. Bradley *et al.* (1979) give its distribution as ". . . the Scottish Highlands, ranging northwards to

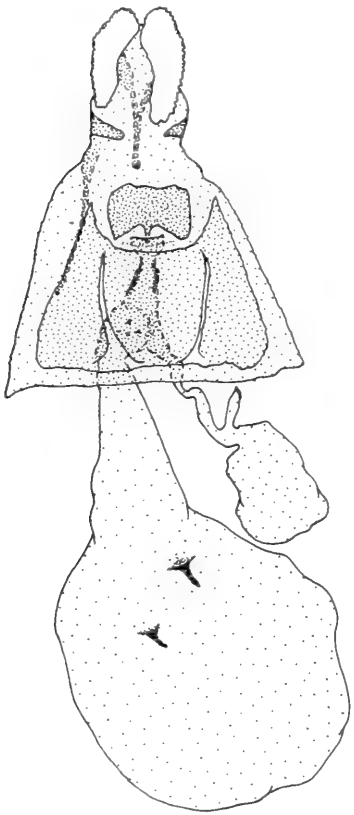

Figure 1. *Cydia illutana* female genitalia.

Sutherland and the Shetlands, and also known from the Inner and Outer Hebrides; an old record from Berwickshire is unconfirmed . . . recorded from Lancashire by Meyrick but the origin of this record is unknown. . . . Elsewhere in the British Isles it is known only from the west of Ireland . . ." It is therefore somewhat surprising that a specimen should be found as far south as Dovercourt. The most likely explanation would appear to be that this specimen is a human-transported stray from elsewhere in the U.K. or abroad; the close proximity of the busy port of Harwich is perhaps significant. However, another possibility is that the moth was wind-blown, as it was collected during a night in which the prevailing wind was coming from Scandinavia. According to Razowski (1996) *C. arbutella* occurs in all four Scandinavian countries.—KEVIN R. TUCK, The Natural History Museum, Cromwell Road, London SW7 5BD.

REFERENCES

Bradley, J. D., Tremewan, W. G. & Smith, A. 1979. *British Tortricoid Moths, Tortricidae: Olethreutinae*. The Ray Society **153**: i–viii, 1–336.

Razowski, J. *in* Karsholt, O. & Razowski, J. (editors). 1996. *The Lepidoptera of Europe*. Apollo Books, Stenstrup.

BOOK REVIEWS

Checklist of Lepidoptera recorded from the British Isles. J. D. Bradley, privately published. 1998. £10.50. Obtainable from D. J. Bradley, The Glen, Frogham, Fordingbridge, Hants SP6 2HS or M. J. Bradley, Walden Villa, Pool Hill, Newent, Glos CL18 1LL, tel. 01425 655006 This checklist of British Lepidoptera is an attempt to update former lists by Bradley & Fletcher, notably the 1979 Log Book. The Channel Islands are, for the most part, excluded. In the classified list scientific names of species and genera are printed in bold, with the authors and dates of specific names only in normal type, although without the customary comma separating author's name and date. In contrast with the 1979 Log Book an attempt has been made to use parentheses for names originally described in a different genus. There is no space before each genus, which is a pity. English names are given in capitals for macrolepidoptera and for those microlepidoptera of economic importance for which they are often used. Synonyms are given where there has been a change from the 1979 Log Book.

Many changes of generic or specific names are included, largely in line with the recently published *Lepidoptera of Europe; a distributional checklist* by Karsholt & Razowski (1996) and sometimes the *Systematic and synonymic list of the Lepidoptera of France, Belgium and Corsica* (second edition) by Leraut (1997). In a number of cases, however, names introduced into use in Europe are classed as *nomina dubia*. The author argues that these names of dubious affiliation pose a threat to the stability of the nomenclature. One has much sympathy with this opinion, but under the current regulations there is little that can be done to suppress an old doubtful name once it has been brought into use, however regrettable that may be. Had the new fourth edition of the International Code of Zoological Nomenclature been published before these European lists, Bradley would be right to reduce such names to synonymy, but now we have different usage in Europe and Britain, which is not a contribution to stability. It would have been possible in the past to have had such names outlawed, although the process is long and cumbersome, but that was not done by some taxonomists like Dr Bradley who were well aware of the threat posed by these old names in the literature.

Changes of status, such as genera regarded as valid by some authors but as subgenera by others, are given square brackets, and the species included within them are marked by inverted commas. This is quite helpful especially since an explanation is given, although people referring to this list will not know which opinion they should follow for consistency. In addition to the list of names there are notes against many species with information about their status or distribution. Much of this information is interesting, although there are a number of minor mistakes, but the selection of species for annotation is arbitrary and another author would doubtless have made a different selection.

Much stress is laid on the value of the numbers given in the 1979 Log Book, which are retained in this publication. This will be welcomed by many who use them in computerised lists, although there are now over 120 names with a or b added, and a few cases where two numbers refer to the same species on account of synonymy being established.

The sequence of families and species is very conservative, differing from the Log Book only where the author felt it essential. A checklist is just a list of the names of species and genera rather than a thesis on the phylogeny and relationships of the families. This conservatism will therefore be welcomed by many, although it is a pity that some consistency across Europe cannot be achieved. It has to be admitted that the European and French lists mentioned above also differ in similar ways. Where species or families have been rearranged there are notes against the numbers to help the reader find the group in question; this is quite helpful, if a little untidy.

Such is the state of our science that only a specialist in each family can give a truly informed list of species with their relationships to each other. In many groups no such person exists, and none would be able to give an overview of the Lepidoptera as a whole. Through his long association with the British fauna John Bradley has been able to attempt this task. This list is a vast improvement on the previous privately published list in 1986 (which is not even referred to!). Whilst one would like a thoroughly error-free list, this is a usable document. Despite its shortcomings it contains the name in current use in most cases for the species of the British Isles and the genus to which each is assigned, and the use of the familiar numbers will ensure that the identity of each species is correctly retained. We must welcome its publication and congratulate the author.

DAVID AGASSIZ

Identifying British Insects and Arachnids. An annotated bibliography of key works. Ed. Peter C. Barnard. Cambridge University Press in association with the Natural History Museum, 1999. Hardback £50. ISBN 0 521 63241 2—It is always said that the British Isles has the best known fauna in the world, the result of generations of collectors, fieldworkers and taxonomists, both amateur and professional. There has been a steady accumulation of reference works and papers on British insects, and since our fauna is only an impoverished part of the continental European fauna researchers have always needed to refer to continental literature. For the beginner in any group this presents a challenge. The landmark publication of Michael Chinery (*Insects of Britain and Northern Europe*) provided a modern attempt to provide an introduction to insect groups and gave a selective bibliography of key works. There are other books on sources of identification, notably those by Hollis (1980, Animal identification: a reference guide) & Sims *et al.* (1988, *Key works to the fauna and flora of the British Isles and northwestern Europe*) but these are now largely outdated, if still a useful start. This current book is, perhaps, an appropriate end-of-century synthesis of everything we would like to know about sources of identification on the British fauna—not just insects but also arachnids. Specialists at The Natural History Museum, London were invited to give all the references on identification they would use for the British fauna. References up to the end of 1997 are included, with just a few from early 1998.

After a short introduction, a section on 'sources of information' is provided by Julie Harvey, Entomology Librarian at the NHM. This is a helpful general account of the scope of entomological literature as well as providing key references to information sources. A guide to the understanding of bibliographic references has been given, including Journal abbreviations and format. A list of major entomological libraries in the UK has also been given. A few website details are given but this is likely to be an area that will expand rapidly.

The bulk of the book is devoted to separate chapters (all authored) on individual insect orders and on arachnids. The coverage goes wider than just references. The introduction to each group provides details of the higher classification and in the case of the Coleoptera, Peter Hammond gives a brief history of publications on the beetle fauna. Coverage does seem to vary a little. Some appear to be covered in greater detail than others. It seems that the publication of every new species to Britain is given in some but not all groups. Some greater consistency in approach might have been made. Many references have also been helpfully annotated to indicate the nature of the work.

The book is excellent. Despite the nature of the work it is readable as well as a reference work and is also very attractively produced. Every entomologist should have a copy but I fear that at £50 it will find fewer buyers than it should. This high price will encourage photocopying of the sections of interest. It should have been no more than £30, when I am sure it would have been a "must have" book. Obviously a work such as this is out of date as soon as it is published (and the work only includes early 1998 citations). The information here lends itself, cries out even, to being a website, where it could be updated at regular intervals. I hope a revised version is treated in this way. I like to think of such a site to cover all insects—or at least western Palaearctic species. Meanwhile I am grateful to all those who have provided this fine book, which really should be used by everyone involved with the British fauna.

M. R. Wilson

The Western Palaearctic Zygaenidae, by C. M. Naumann, G. M. Tarmann & W. G. Tremewan. Apollo Books, Stenstrup, 1999, 304 pp., hardcover, 600.00 Danish Kroner—Zygaenid moths have been described appropriately as honorary butterflies, for the bright colours and diurnal behaviour of both these groups have attracted the attention of researchers interested in similar kinds of biological questions. Yet zygaenids have been relatively neglected compared with their more well-known lepidopteran relatives. This book, written by three well-respected specialists on the Zygaenidae, is a valuable guide to the species occurring in the Western Palaearctic region. It includes, furthermore, a general account of zygaenid biology, in a section forming a 95-page first part, which comprises about one-third of the book. This substantial introductory component provides readers with a summary of the general biology of the family, which, it should be noted, incorporates the results of recent research. The detail and depth of these sections vary considerably. For example, the opening section on systematics and phylogeny is very brief, whereas that on ecology and behaviour is more substantial. The general tone adopted by the authors is descriptive and factual rather than analytical, and the book is decidedly more for the user rather than the reader wishing to explore ideas in zygaenid biology. Such a style is entirely consistent with the second part of the book, which provides a solid species by species account of the zygaenid fauna of the Western Palaearctic and, thus, a significant component of the zygaenid moth fauna of the world.

These species treatments are presented in an attractive fashion. I particularly admired the way in which subspecies are considered under a subheading 'Geographical variation' with only the more 'outstanding' subspecies being described in a group that is prone, as with butterflies, to excessive, and often meaningless, splitting at the infraspecific level. But I was surprised at the lack of a general explanation as to the basis of how species (and subspecies) are recognized in zygaenid moths. Each species treatment refers to a colour illustration, includes an indication of size by way of the range of forewing length, and gives a description of each sex, complemented by diagnostic comments and illustrations of male and female genitalia. Similar species are noted and distinguished and there are further headings on individual variation, distribution, ecology and on immature stages and larval foodplants. The style is admirably even and succinct, revealing the considerable effort and thought that has gone into the construction of this book. The drawings of the genitalia are clean and produced at an ideal size. There are six colour plates of cabinet-set specimens representing species and major subspecies, three featuring examples of live adults and immatures, and two showing a range of habitats. The quality of reproduction of the plates is high, although an indication of scale (additional to forewing-length range in the text) would have been helpful. I would have been inclined to have foregone some of the plates of live insects and even habitats (attractive as they are), for larger images of the set specimens, which provide the most direct means of identification. The species accounts are framed by equally succinct subgeneric, generic, subfamily and family diagnoses, and there are keys to all taxonomic ranks down to species throughout the text.

We may welcome, with justified enthusiasm, the growth of the internet for the presentation of much of the data to be found in *The Western Palaearctic Zygaenidae*—particularly as the system offers such great potential for large-scale storage of images. But I shall be surprised if ever the web should quite displace, for natural history, or indeed any other subject, that flexible, compact, portable, user-friendly, age-old yet so very imaginative invention called the book, of which this work is a worthy example.

MALCOLM SCOBLE

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The Society invites applications for grants, from its Research Fund, to be awarded in December 2000. Awards are open to both members and non-members of the BENHS and will be made to support research on insects and spiders with reference to the British fauna, and with emphasis on:

(a) the assistance of fieldwork on insects with relevance to their conservation,
(b) work leading to the production of identification guides and distribution lists.

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(b) Diptera, particularly Tephritidae and Agromyzidae
(c) Lepidoptera, particularly Microlepidoptera
(d) general entomology

in the above order of preference having regard to the suitability of applicants and the plan of work proposed.

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July 2000 ISSN 0952-7583 Vol. 13, Part 2

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY

BRITISH ENTOMOLOGICAL & NATURAL HISTORY SOCIETY

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY

Published by the British Entomological and Natural History Society and incorporating its Proceedings and Transactions

Editor: M. Wilson, Ph.D., F.R.E.S., F.L.S. Department of Biodiversity & Systematic Biology, National Museums & Galleries of Wales, Cardiff CF10 3NP. (Tel: 02920 573263, Fax: 02920 239009) email: Mike.Wilson@nmgw.ac.uk

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British Journal of Entomology and Natural History is published by the British Entomological and Natural History Society, Dinton Pastures Country Park, Davis Street, Hurst, Reading, Berkshire RG10 0TH, UK. Tel: 01189-321402. The Journal is distributed free to BENHS members.

Typeset by Dobbie Typesetting Limited, Tavistock, Devon.
Printed in England by Henry Ling Ltd, Dorchester, Dorset.

BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY

Registered charity number: 213149

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SOME PROPERTIES OF RARITY SCORES USED IN SITE QUALITY ASSESSMENT

PAUL WILLIAMS

Biogeography and Conservation Lab., The Natural History Museum, London SW7 5BD, UK.

Abstract. Species lists for sites are often compared for rarities using an index of the average or mean national range size of the species ('species quality score' or SQS). This paper describes some properties of SQS that need to be kept in mind when interpreting the results, illustrated using atlas data for bumble bees on a 10×10 km grid. Results show that SQSs may be correlated (1) with recorded species richness; and (2) with recording effort. With these data, national SQSs are capable of identifying concentrations of species with narrow national distributions even within species-poor areas of northern Britain, so that a separate regional treatment is not always necessary. However, the most important observation is that, despite these correlations, the most extreme high and low SQS values can only occur when recorded species richness is low, which, when due to low recording effort, could be very misleading. Similar measures of range-size rarity from the conservation literature are discussed, as well as other approaches for looking at how available data may be used to find combinations of sites (some of them species-poor but with rare species) that represent a greater diversity of wildlife.

INTRODUCTION

Rare species are often given special value, particularly for conservation (e.g. Ratcliffe, 1977; Usher, 1986; Callicott *et al.*, 1999). Once species lists have been compiled for a number of sites, people like to compare them to see which sites have more of the rarer species (e.g. Lott *et al.*, 1999), even when conservation areas are chosen using other criteria. Rarity of species is often assessed in terms of the sizes of their distribution ranges (Rabinowitz, 1981; Gaston, 1994), at least when information on population sizes is unavailable. To compare sites, simple sums of species-rarity scores have been used, as well as more complex indices (see bibliography by Eyre, 1996b).

One apparently straightforward index of rarity for a site is the average or mean range size among the recorded species. This 'species quality factor', 'species quality score', or 'Species Quality Index' was proposed originally for assessing sites by regional rarity of species (Foster, 1987; Eyre & Rushton, 1989; Foster *et al.*, 1990; Crossley, 1996; Eyre, 1996a; Eyre *et al.*, 1996; Foster, 1996; Luff, 1996). Later, it was extended to represent national rarity within Britain, as a 'Species Quality Index', 'species quality score', or 'Species Quality Factor' (Ball, 1992; Archer, 1995, 1996a, b, c, d, 1997a, b, c, 1998a, b, 1999a, b, c; Eyre *et al.*, 1996). This index (henceforth 'SQS') is based on the average or mean of national rarity 'status scores' among the species recorded at a site. SQSs above a particular value are then considered to indicate places with high conservation value for the group concerned.

The aim of this paper is to describe some properties of SQS. The analysis uses atlas data for bumble bees recorded on a grid of 10×10 km cells, rather than the smaller sites that are of more interest to many field workers. This choice should not be taken to imply either that this is necessarily the most appropriate scale for analysis, or that bumble bees are a particularly appropriate group for area assessment. Rather, these data are used to illustrate what are expected to be general properties of SQS (and of

similar indices using mean-rarity scores) that arise from the form of the index, and which need to be kept in mind when interpreting the scores.

Two important claims made for SQS are explored here. These are, first, that variation among sites in SQSs shows a positive relationship with the numbers of species (Archer, 1995); and second, that the SQS corrects for differences in recording effort among sites (e.g. Foster, 1987; Ball, 1992; Archer, 1996a). Similar measures of range-size rarity from the conservation literature are discussed, as well as other approaches for looking at how available data may be used to find sites that, in combination, could represent a greater diversity of wildlife.

Methods

The idea behind the SQS is to weight species according to the size of their distribution ranges within Britain, giving the highest weights to the most restricted species. Archer (1995) described one national scoring scheme. This was based initially on Red Data Book categories for species (as revised by Falk, 1991), although the definition of the categories or classes of species has since been modified, so that they have become grouped primarily by numbers of 10×10 km grid cells with post-1970 records (Table 1). Species in each range-size class are given a particular score, and these scores are added up for a site from all of the species in the site list. The total species score is then divided by the number of species recorded to give an SQS for the site. In some studies, scores above 2.0 have been suggested to indicate 'good quality' sites (Foster & Eyre, 1992; Archer, 1996a).

An assessment of some of the properties of the SQS can be made using published data for bumble bees, a small but relatively well known group of insects. Groups with a few species are not typical of SQS applications, but can still be useful for illustrating its mathematical properties. Twenty-two species of bumble bees have

TABLE 1. Species status scores within Britain for the 22 species of bumble bees (*B. magnus* is treated as part of *B. lucorum* in the broad sense) interpreted from Archer (1998b) and the status categories from Archer 1997b).

Status	Criteria (British range extent)	Status score	Bumble bees (*Bombus*)
universal	>70 10×10 km grid cells + ITE Land Classification groups 1–8	1	*barbutellus*, *bohemicus*, *campestris*, *hortorum*, *lapidarius*, *lucorum s.l.*, *pascuorum*, *pratorum*, *sylvestris*, *terrestris*
widespread	>70 10×10 km grid cells + ITE Land Classification groups 1–4 (c. 75% Britain)	2	*jonellus*, *monticola*, *muscorum*, *vestalis*
restricted	>70 10×10 km grid cells + ITE Land Classification groups 1–2 (c. 50% Britain)	4	*humilis*, *ruderarius*
scarce	31–70 10×10 km grid cells	8	*distinguendus*, *ruderatus*, *rupestris*, *soroeensis*, *sylvarum*
rare	16–30 10×10 km grid cells	16	(none)
very rare	1–15 10×10 km grid cells	32	*subterraneus*

been recorded post-1960 among 2199 of the 10×10 km grid cells in Britain (excluding Ireland, where recording effort was generally lower) by the Bumblebee Distribution Maps Scheme (Alford, 1980). A study across the whole of Britain is used to find out to what extent the SQS can identify faunas rich in rare, regionally specialist species, even when the analysis is not subdivided by latitude, climatic regions, or major land-classification groups. The bumble bee atlas maps do not show post-1970 records separately, so post-1960 records have had to be used (for some species at least, there is doubt concerning validity of some of the records: Edwards & Roberts, 1998; although this should not affect the conclusions here). Archer (1998b) has already published species status scores for bumble bees in Britain, as shown in Table 1. Treating the 10×10 km grid cells as 'sites' for the purposes of this exploratory analysis, the SQSs for bumble bees from the atlas data can then be mapped (Williams, 1996). For bumble bees, this change of scale from smaller sites to 10×10 km grid cells should not be as severe a misrepresentation of patterns of co-occurrence among species at local sites as it might be for some other groups, because these bees may forage several kilometres from their nests.

Unfortunately the 'true' species richness of a site, and the amount of effort put into recording from it, are usually only poorly known (e.g. Colwell & Coddington, 1994; Dennis *et al.*, 1999). As with most atlases, the bumble bee atlas has no map of variation in the intensity of recording effort, only a map showing the cells from which at least one record was received. One possibility is to use the number of recorded 'mainland ubiquitous species' (Williams, 1982: *Bombus hortorum*, *lapidarius*, *lucorum*, *pascuorum*, *pratorum*, *terrestris*) as a rough measure of recording effort, because these species appear to be nearly ubiquitous where adequate sampling effort has been expended, at least for much of central and southern Britain (Williams, 1988). Scotland and the Isle of Man are excluded for this part of the analysis concerning recording effort, because some of the mainland ubiquitous species (particularly *B. lapidarius*, *terrestris*) are genuinely less widespread there (pers. obs.).

Results and discussion

Fig. 1 maps SQSs for bumble bees from the atlas data. The map shows weak aggregations of high scores associated with the more restricted species, which were recorded primarily in the north west and south east of Britain. Therefore, at least with these data, national SQSs are capable of identifying concentrations of records for species with narrow national distributions even within northern Britain. Therefore, the choice of whether to use a national or a regional basis for the SQS should depend on whether the goal of the study is to assess sites within a national or a regional context. A similar geographical pattern of range-size rarity is known from some other groups of organisms, such as birds (Williams, Gibbons *et al.*, 1996: fig. 1).

(1) SQS and species richness

SQSs are correlated with recorded richness in all species for the bumble bee atlas data (Spearman rank correlation $r_s = 0.44$, $p < 0.001$, if data points are assumed to be independent). Nonetheless, the highest SQSs come from cells with fewest recorded species (Fig. 2a). This is a result of dividing the cumulative species scores by the numbers of species, because the highest site scores can only be obtained where all species share the highest status scores (which is almost inevitably where these species are few in number). As the number of species recorded approaches the total of 22, so

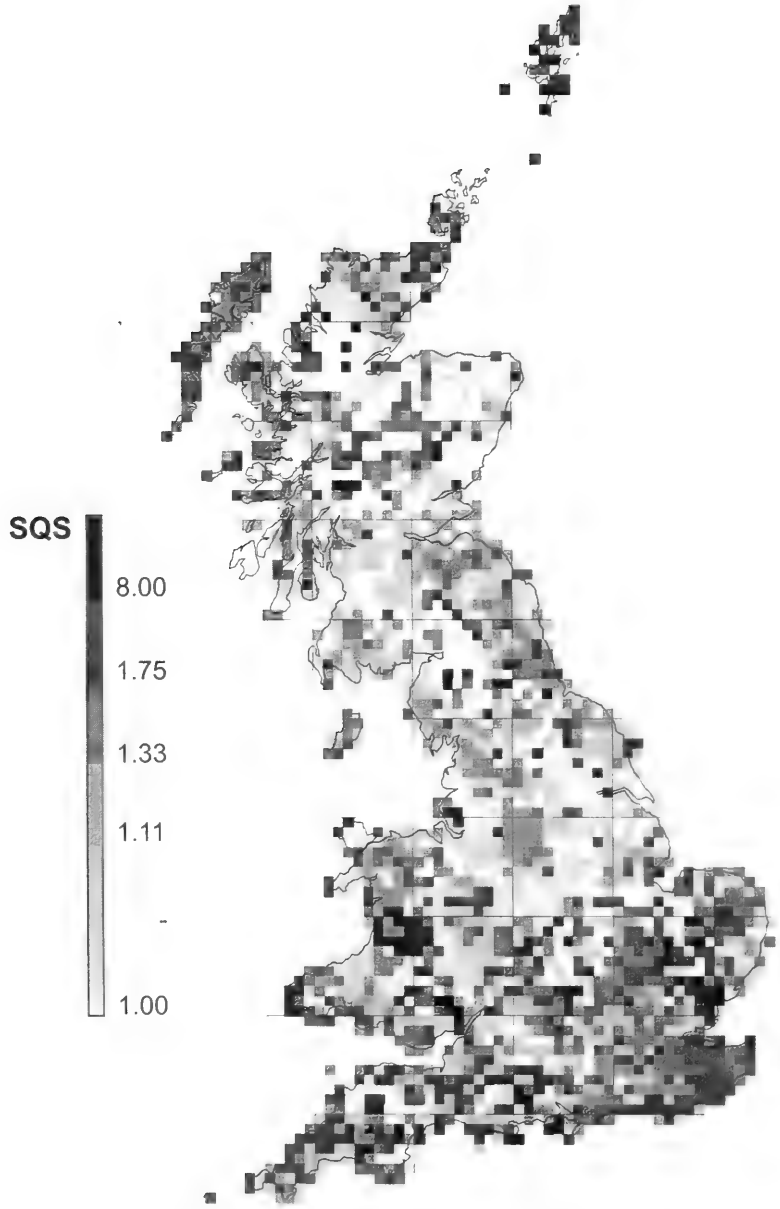

Fig. 1. SQSs for 10×10 km grid cells from the species-status scores in Table 1 and records from the bumble bee atlas (Alford, 1980). Each grey scale class represents approximately one fifth of the map (except where constrained by large numbers of ties), with black for the maximum score (8) and pale grey for minimum scores (1).

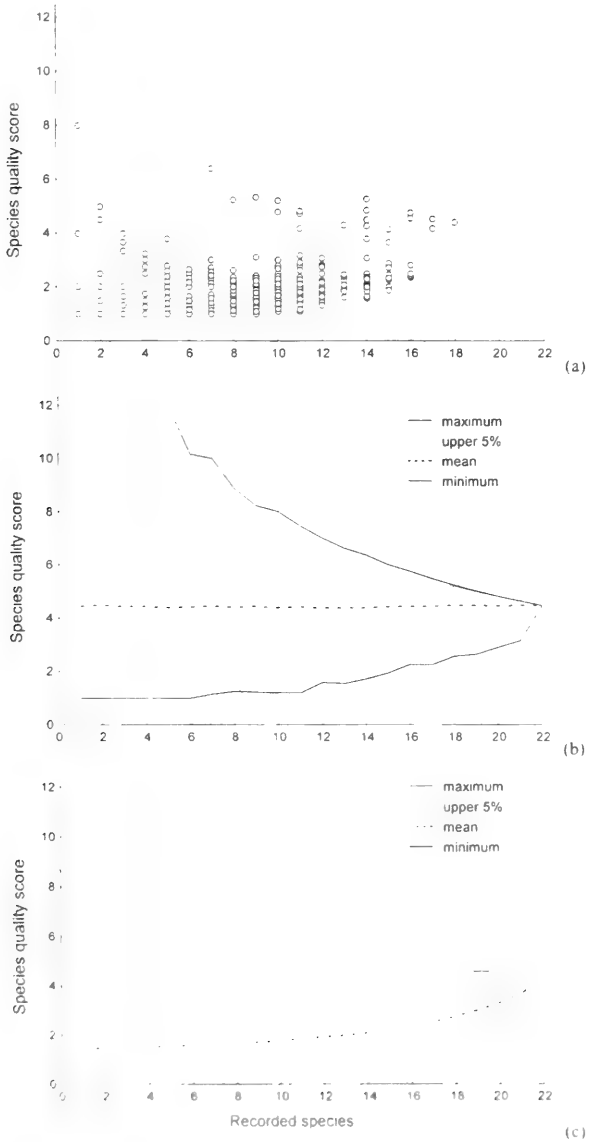

Fig. 2. (a) SQSs for 10 × 10 km grid cells (see Fig. 1) from the species-status scores in Table 1, plotted against number of species recorded in the bumble bee atlas (Alford, 1980). (b) Simulated SQSs for 10 × 10 km grid cells by drawing species randomly (1000 times without replacement) from the species-status scores in Table 1, for each number of species. The probabilities of drawing each species are equal. (c) As (b), but the probability of drawing a species is dependent on the number of grid cells from which it is recorded in the bumble bee atlas. Axes are drawn to the same scale to aid comparison, although the maximum possible score for one recorded species is 32.

site scores must converge on the overall mean score among species (in bumble bees from Table 1, this is 4.45), creating the 'funnel' effect shown towards the right of Fig. 2a. The problem with this is that a species-rich site could end up with a lower SQS than another site with the same rare species, but with a subset of the same widespread species (e.g. a site with all of the bumble bee species would score 4.45, whereas a site with the same fauna but lacking *B. lucorum, pratorum, bohemicus* and *sylvestris* would score a higher 5.22).

The funnel effect can be demonstrated by simulating randomly drawn bumble bee faunas and calculating their SQSs, as shown in Fig. 2b. This procedure naïvely assumes that each species is equally likely to be chosen. Comparing Figs 2a and 2b, it appears that the SQSs observed from the bumble bee atlas data tend to lie towards the lower end of the range of scores expected by chance, at least for smaller numbers of recorded species. This bias arises because, in reality, smaller faunas are often made up disproportionately from the more widespread species, which contribute lower scores to the SQSs. Therefore Fig. 2c repeats the simulation of drawing species at random, but this time takes range size into account, by assuming that the chance of drawing any one species is related to the number of cells from which it is recorded nationally in the bumble bee atlas. The positive slope of the expected mean SQS line in Fig. 2c ($r_s = 0.22$, $p < 0.001$) shows that this range-size effect is likely to be responsible for the positive correlation between SQSs and species richness for the bumble bee atlas data in Fig. 2a. In addition, if the widespread species were also the more abundant species locally, then they would be even more likely to be recorded from the richer cells when sample sizes were small (see (2) below). Thus, Fig. 2 illustrates a serious limitation of using mean (or median) scores among species: that the highest site scores can only be obtained for sites where few species have been recorded. The same is true of the lowest site scores, although they are less constrained by recorded richness because there are more of the 'universal' species (Table 1). Low recorded richness may arise because sites are simply under-recorded (very likely in this case: see below), although SQS could also give the highest scores to sites that are genuinely most species-poor. The funnel effect should be less of a problem when dealing with many larger groups, such as all solitary bees and wasps (as in the case of Archer's studies), because the maximum number of species occurring at any one site or 10×10 km grid cell is likely to be a smaller proportion of the total number of species (e.g. less than 50% when recording all British aculeate species, (S. Roberts pers. comm.), compared with up to 86% of bumble bee species (pers. obs.).

Fortunately, the simulation approach offers a way to judge whether a cell has a higher or lower SQS than would be expected by chance, given the number of species recorded. Any SQSs in Fig. 2a that fall above the upper 5% dotted line in Fig. 2c would be significantly higher than expected. There are 87 cells with these scores (Fig. 3), which is actually 4% of the total cells with records, so the simulation in Fig. 2c appears to fit the data reasonably well. Therefore, as a general guide, because the upper 5% line in Fig. 2c lies at SQSs of approximately 4.0 for these data, cells scoring more than 4.0 might be considered of special interest. This is considerably higher than the threshold of 2.0 recommended (for different data) by Foster & Eyre (1992) and by Archer (1996a). Two qualifications are important. First, this value is expected to differ among data sets because it depends on the range sizes within Britain of the particular set of species. Second and more important, rather than reflecting patterns of biological interest, even significantly higher values could simply be the result of under-recording, as discussed below, or of selective recording. Comparing the geographical distribution of extreme probability

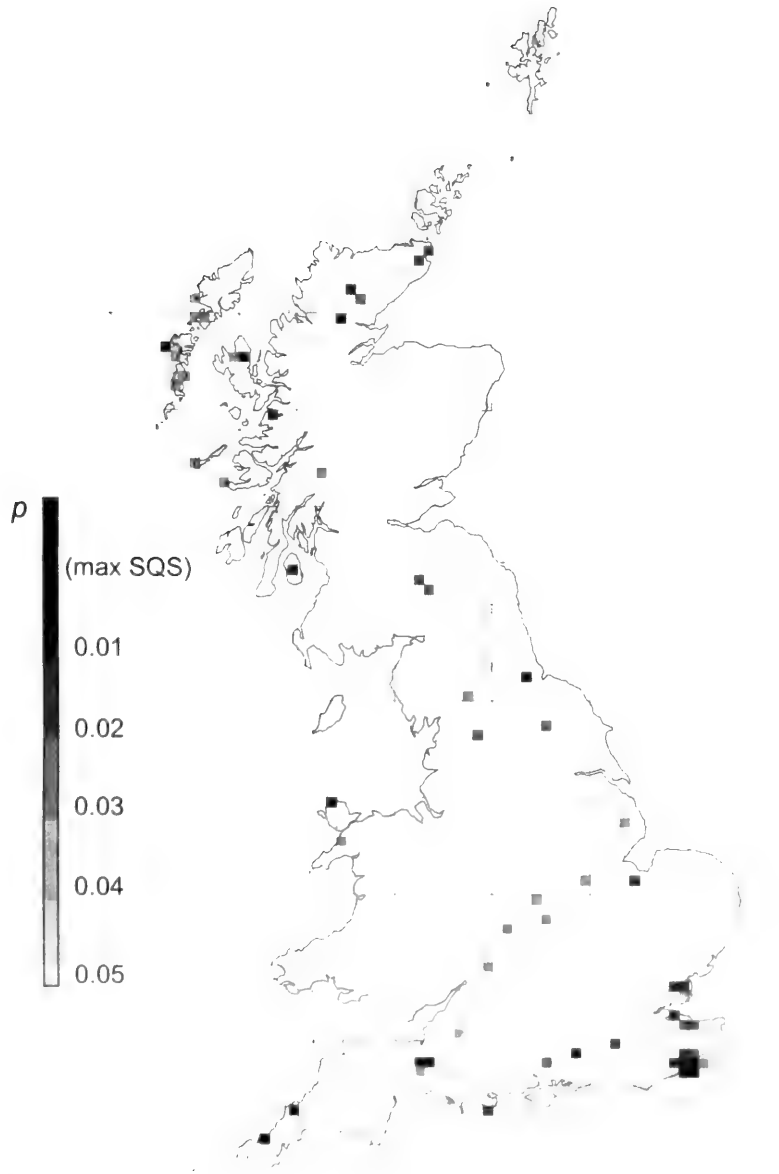

Fig. 3. 10 × 10 km grid cells with significantly higher SQSs (Fig. 2a) from the bumble bee atlas data (Alford, 1980) than would be expected by chance for their levels of species richness (i.e. cells above the fine dotted line in Fig. 2c). The grid-cell values show the estimated probabilities of obtaining the SQSs from Fig. 1 that fall within the upper 5% tail of the simulated distribution in Fig. 2c for each level of species richness ('max SQS' is the maximum score obtained from the simulation in each case).

estimates for SQSs in Fig. 3 with the original bumble bee SQSs in Fig. 1, Fig. 3 gives less emphasis to some apparently high-scoring regions, particularly in Shetland, the Grampians, and Wales. If some of the rarer species of northern and upland areas are actually valued by people more highly than Fig. 3 would imply, then (rather than dividing the analysis by region within Britain) an appropriate recognition of this higher value would be to upgrade the status scores for these species in Table 1 and re-calculate the SQSs. On the other hand, Fig. 3 does draw particular attention to the area around Dungeness, which is well known for its rich bumble bee fauna with many rarities (e.g. Williams, 1989).

(2) SQS and recording effort

SQSs are correlated with recording effort as measured by recorded richness in mainland ubiquitous species from the bumble bee atlas data (Fig. 4: $r_s = 0.37$, $p < 0.001$). Of course, a question mark has to remain over whether richness in mainland ubiquitous species provides a good surrogate for measuring recording effort, at least until the relationship can be tested over a broad region of the country. Nonetheless, a correlation between SQSs and recording effort would be expected because the rarer bumble bee species (which contribute most to the SQSs) also tend to be the less abundant species locally (at least when measured across several sites where they are present: Hanski, 1982; Williams, 1988), and are therefore most likely to be recorded from the more intensively recorded cells (along with more species of mainland ubiquitous bumble bees).

Despite the correlation between SQSs and recording effort, the highest SQSs come from cells with no records of the mainland ubiquitous species (Fig. 4). One explanation for such high scores for these cells may be the chance effect of recording just a few rare species from within larger faunas (compare Fig. 2), if these cells had indeed been particularly poorly recorded (it has been known for people to find only the very rare *B. subterraneus* in samples of just one or two bees). Consequently, even some of the high-scoring cells from Fig. 2a that are significantly higher than expected by chance in Fig. 2c may only appear to be of high value because of under-recording and the sensitivity of the SQS at low recorded richness.

If suitable data on local abundances of each species were available, it would be possible to take sub-samples of bees from these data at random (a 'rarefaction' method) in order to assess the effect of sample size (as a measure of recording effort) on the SQSs for sites. Similar methods could in principle be used to compare SQSs among sites, if data for recording effort were available, using a modification of the method described by Prendergast *et al.* (1993b). Unfortunately, however, the popular methods that use data from small samples to extrapolate an expected species richness for a site (e.g. Colwell & Coddington, 1994) are of little use for calculating SQSs, because the identities and range sizes of the expected but unrecorded species remain unknown.

The sites surveyed by Archer (1995, 1996a, b, 1999b, c) were much more intensively and consistently recorded than were many of the cells recorded for the bumble bee atlas. Some scoring studies have tried to ensure consistency in recording effort by incorporating thresholds that must be reached before scores may be considered reliable (e.g. Hammond & Harding, 1991). However, using thresholds based on the species data relies on assumptions of what the data and thresholds are expected to look like. Whenever the opportunity arises, it would be better to avoid the need for these assumptions by trying to ensure from the outset that samples are as large and as comparable in terms of recording effort as possible (e.g. Rich, 1997).

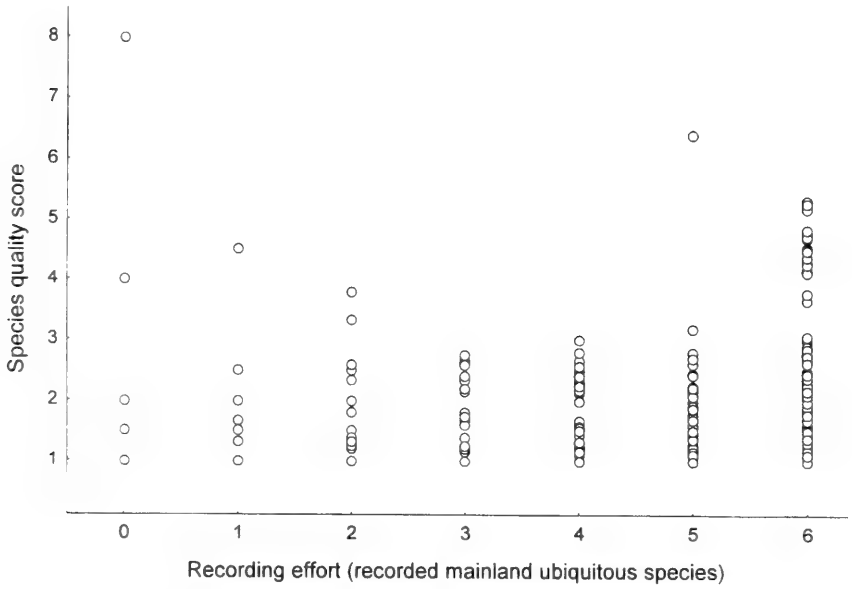

Fig. 4. SQSs for 10 × 10 km grid cells (see Fig. 1) from the species-status scores in Table 1, plotted against recording effort, measured using the number of mainland ubiquitous species recorded in the bumble bee atlas (Alford, 1980), excluding records for Scotland and the Isle of Man.

For this purpose, standards for recording effort ought to be measured in terms of something like area searched or time expended (bias is introduced if thresholds are applied to characteristics of the sample used in the index, such as species richness). Indices should then be able to apply rarity criteria more consistently, even at a national scale, reducing the need to restrict comparisons of SQS to particular habitats or regions.

Related measures of range-size rarity

Two other closely related measures of where rarities occur have been in use in conservation studies for some time. These measures do require a more precise knowledge of the range sizes of the species (e.g. from atlas data), but they also avoid the need to define an arbitrary number of status classes. In addition, all of these measures could use measures of European or global range size, in place of range size within Britain, if this were considered more appropriate to the aims of a study, and if the data were available.

First, rather than putting species into groups by their range sizes, 'range-size rarity' measures are simple indices calculated directly from estimates of range sizes. There is no clearly best or 'natural' index for this, although the most popular formula has been the sum of the inverse of the range sizes (Table 2, middle row). Thus for grid-based data, if a species is recorded from 1 cell it scores 1, from 10 cells it scores 0.1, from 100 cells it scores 0.01, and so on, and the scores are added up for the

Table 2. Examples of indices of range-size rarity using continuous functions of range size. In effect, the relative weighting given to the most restricted species increases (and sensitivity to richness decreases) in the indices towards the bottom of the table. Range size may be measured, for example, as the number of occupied cells (c_i) for species (i) in a grid. C is the total number of cells in the grid and S is the total number of species. The score for a grid cell is the sum of the scores from all of the species recorded as present within it. Symbols have been changed from original references in order to standardise formulae.

Formula	Examples
$\Sigma_{\{i:ci\neq 0,\ 1\leq i\leq S\}}\ (C-c_i)$	Daniels *et al.*, 1991
$\Sigma_{\{i:ci\neq 0,\ 1\leq i\leq S\}}\ (1/c_i)$	Jefferson, 1984; Usher, 1986; Avery & Leslie, 1990; Howard, 1991; Turpie, 1995; Williams *et al.*, 1996
$\Sigma_{\{i:ci\neq 0,\ 1\leq i\leq S\}}\ (1/c_i^2)$	Williams, 1996

species recorded in each cell. The effect is to give greater weight to the most restricted species, while the widespread species have little effect on the scores. The scores for cells may then be divided by the numbers of species recorded within each cell in order to provide a measure sensitive to the proportion of relatively restricted species (e.g. Williams, Gibbons *et al.*, 1996: fig. 1d; Williams, Prance *et al.*, 1996: fig. 4). Geometric weighting of range size by the mean inverse formula is very similar to the weighting in SQSs, as shown by a high correlation for the bumble bee atlas data ($r_s = 0.86$, $p < 0.001$).

Second, a much simpler measure that has been used to show where rarities occur is the median range size among the species recorded for each cell (Smith *et al.*, 1994). It has the advantage that properties of the median are well understood. The disadvantages are that its value decreases as the proportion of restricted species increases and, of more importance, that it is more strongly influenced by the more widespread species. Consequently it is not as closely correlated as inverse range-size rarity with SQSs for the bumble bee atlas data ($r_s = -0.68$, $p < 0.001$).

Both of these measures are easily calculated for large numbers of atlas data at any spatial scale using widely available personal computers. However, because they both have fundamentally similar formulations to the SQS, they also suffer from similar limitations, and particularly from the funnel effect of converging scores at high species richness (discussed by Williams, Prance *et al.*, 1996).

Slightly different are measures of rarity that include scores for species only if they are more restricted than some threshold (Gaston, 1994). Excluding widespread species from scoring has been used in studies at local (e.g. Hammond & Harding, 1991), continent-wide (Terborgh & Winter, 1983), and world-wide (ICBP, 1992) scales. Just as there is no 'natural' formula for the measures of range-size rarity described above, so the choice of range-size threshold also has to be essentially arbitrary. Thresholds have been criticised because they will always miss species with marginally larger ranges that are important to some people (Crowe & Siegfried, 1993).

Recognising important sites

The conservation value of sites depends on many factors, some of them purely social, and some of them depending on socially-valued biological attributes (e.g. Goldsmith, 1991). Quantitative methods for scoring the biological value of sites (and

often by implication, selecting 'hotspots' of various kinds, see Prendergast *et al.*, 1993a, b; Palmer, 1999) are a practical way of helping to make the basis of expert opinion more explicit and accountable when faced with difficult and contentious decisions. If people would like to conserve species, then (ignoring questions of whether these species are more or less widespread outside Britain) a species' range size within Britain gives one crude measure of the relative number of opportunities for representing it here for the future.

Ultimately, if the aim is to conserve as many species of bees, wasps, ants (or any other organisms) as possible, despite limited opportunities, then we will have to move from simple hotspots to other approaches that consider how combinations of sites (and different forms of management) can represent this diversity of species (Pressey & Nicholls, 1989). The solution to the selection part of the problem is to use the simple idea of complementarity, which allows the greatest *combined* numbers of *different* species to be represented. This approach can avoid representing many common species more than may be necessary at the cost of missing many rarer and more specialised species, many of which may occur only within species-poor sites. For an example of the principle using British data, see Williams, Gibbons *et al.* (1996), although ideally the areas used should be appropriate land-management units, not 10 × 10 km grid cells. Table 3 shows how these hotspots of complementary richness can increase the representation of the rarest species in particular (if preferred, this method could also be used to seek the maximum possible representation for these species to add to existing conservation areas). As with any approach, it is vital that the many other important constraints be taken into account, including local viability, threat and cost, from whatever information is available (reviewed by Williams, 1998). With complementarity, the emphasis is not primarily on the diversity or rarity of species at a site, but on which species a site can contribute (as good viable populations) towards a broader plan for representing British wildlife for the future (the choice and scale of appropriate management will depend on many biological and social factors). This approach is not fundamentally opposed to other methods, neither is it any more prescriptive: it merely makes it possible to identify

Table 3. Number of representations for bumble bee species from atlas data (Alford, 1980) in 10 × 10 km grid cells selected by three methods. The cells in the fourth column are the 87 cells in Fig. 3 with significantly higher SQSs than expected by chance (Fig. 2c). Taking this arbitrary number as a basis for a comparison, the hotspots of richness in the third column are the 87 cells with the highest numbers of species records in the atlas data. The hotspots of complementary richness in the last column are obtained by searching for a set of 87 cells with the maximum coverage of every species (87 cells is just below the 90 cells that would be required to represent every species at least 24 times, or for the more restricted species, such as *B. subterraneus*, to include all 22 cells with atlas records).

Bumble bees (*Bombus*) by status class (see Table 1)	Records in 2199 British grid cells (totals)	Records in 87 hotspots of richness	Records in 87 cells with unexpectedly high SQSs	Records in 87 hotspots of complementary richness
universal	9196	770	289	525
widespread	1247	163	77	134
restricted	552	118	49	67
scarce	395	117	101	121
very rare	22	14	21	22

and fill 'gaps' in existing conservation coverage more easily, ideally by putting good autecological and synecological studies of species within a larger framework.

SQS and similar indices based on means are relatively easy to calculate. However, when using them, biologists need to be aware that, with under-recording, they may generate extreme and misleading values, and that scores tend to converge on a group's mean score when most species in the group co-occur. These methods (if applied to comparable large samples and interpreted with care) could provide a rough guide to the contribution that sites can make to representing the diversity of wildlife, but only if (as may often be the case) rare species are likely to differ among sites. More reliably, complementarity methods, which take direct account of species differences among sites, will usually identify combinations of sites that represent more species in total.

Acknowledgements

This study is only possible thanks to the many volunteer field workers who contributed the atlas records, and to the International Bee Research Association and the Biological Records Centre for compiling the atlas maps. My thanks to M. Archer, M. Edwards, M. Eyre, P. Hammond, L. Manne, C. Moncrieff, R. Vane-Wright and a referee for comments and discussion.

References

Alford, D. V. (ed.) 1980. *Atlas of the bumblebees of the British Isles*. Institute of Terrestrial Ecology, Cambridge.

Archer, M. E. 1995. Aculeate wasps and bees (Hymenoptera: Aculeata) of Blaxton Common in Watsonian Yorkshire with the introduction of a new national quality scoring system. *Naturalist* **120**: 21–29.

Archer, M. E. 1996a. The aculeate wasps and bees (Hym., Aculeata) of Sherwood Forest in Nottinghamshire and the development of a national quality assessment scheme. *Entomologist's Monthly Magazine* **132**: 35–44.

Archer, M. E. 1996b. The aculeate wasps and bees (Hymenoptera: Aculeata) of Shipley Glen in Watsonian Yorkshire with a "then" and "now" comparison. *Naturalist* **121**: 53–59.

Archer, M. E. 1996c. The use of solitary wasps and bees in site assessment for wildlife conservation. pp. 14–17 in: Eyre, M. D. (ed.) *Environmental monitoring, surveillance and conservation using invertebrates*. EMS Publications, Newcastle.

Archer, M. E. 1996d. The status and quality coding of the species of mason wasps (Hymenoptera: Eumenidae). *BWARS Newsletter* **1996**(2): 4–5.

Archer, M. E. 1997a. Status and quality coding of species – part 2. *BWARS Newsletter* **1997**(1): 4–5.

Archer, M. E. 1997b. The aculeate wasps and bees (Hymenoptera: Aculeata) of two calcareous localities in Watsonian Yorkshire: Burton Leonard lime quarries and Cave Wold. *Naturalist* **122**: 45–52.

Archer, M. E. 1997c. Status and quality coding of species of aculeate Hymenoptera – part 3. *BWARS Newsletter* **1997**(2): 8.

Archer, M. E. 1998a. Status and quality coding of species of aculeate Hymenoptera – part 4. *BWARS Newsletter* **1998**(1): 9–10.

Archer, M. E. 1998b. Status and quality coding of species of aculeate Hymenoptera – part 5: the social wasps and bees. *BWARS Newsletter* **1998**(2): 13–14.

Archer, M. E. 1999a. Status and quality coding of species of aculeate Hymenoptera – part 6: solitary species of part 2 of the Provisional Atlas. *BWARS Newsletter* **1999**(1): 15–16.

Archer, M. E. 1999b. The aculeate wasps and bees (Hymenoptera: Aculeata) of the Ainsdale Formby sand dunes on the Lancashire coast compared with other northern sites. *British Journal of Entomology and Natural History* **12**: 1–10.

Archer, M. E. 1999c. The aculeate wasps and bees (Hymenoptera: Aculeata) of Holmehouse Wood, near Keighley, in Watsonian Yorkshire, including a jack-knife statistical procedure for estimating species richness. *Naturalist* **124**: 75–82.

Avery, M. & Leslie, R. 1990. *Birds and forestry*. Poyser, London.

Ball, S. 1992. The importance of the invertebrate fauna of Thorne and Hatfield Moors: an exercise in site evaluation. *Thorne & Hatfield Moors Papers* **3**: 34–65.

Callicott, J. B., Crowder, L. B. & Mumford, K. 1999. Current normative concepts in conservation. *Conservation Biology* **13**: 22–35.

Colwell, R. K. & Coddington, J. A. 1994. Estimating terrestrial biodiversity through extrapolation. *Philosophical Transactions of the Royal Society of London* (B) **345**: 101–118.

Crossley, R. 1996. Using Diptera in assessing site quality, with particular reference to Empidoidea—a regional perspective. *Naturalist* **122**: 155–157.

Crowe, T. M. & Siegfried, W. R. 1993. Conserving Africa's biodiversity: stagnation versus innovation. *South African Journal of Science* **89**: 208–210.

Daniels, R. J. R., Hegde, M., Joshi, N. V. & Gadgil, M. 1991. Assigning conservation value: a case study from India. *Conservation Biology* **5**: 464–475.

Dennis, R. L. H., Sparks, T. H. & Hardy, P. B. 1999. Bias in butterfly distribution maps: the effects of sampling effort. *Journal of Insect Conservation* **3**: 33–42.

Edwards, M. & Roberts, S. P. M. 1998. *Bombus sylvarum* [map]. *BWARS Newsletter* **1998**(1): 39.

Eyre, M. D. 1996a. Examples of site assessment and environmental surveillance using invertebrates in northern Scotland. pp. 48–52 in: Eyre, M. D. (ed.) *Environmental monitoring, surveillance and conservation using invertebrates*. EMS Publications, Newcastle.

Eyre, M. D. 1996b. *A bibliography of work relating to invertebrates in environmental monitoring and conservation*. EMS Publications, Newcastle.

Eyre, M. D., Lott, D. A. & Garside, A. 1996. Assessing the potential for environmental monitoring using ground beetles (Coleoptera: Carabidae) with riverside and Scottish data. *Annales Zoologici Fennici* **33**: 157–163.

Eyre, M. D. & Rushton, S. P. 1989. Quantification of conservation criteria using invertebrates. *Journal of Applied Ecology* **26**: 159–171.

Falk, S. 1991. *A review of the scarce and threatened bees, wasps and ants of Great Britain*. Nature Conservancy Council, Peterborough.

Foster, G. N. 1987. The use of Coleoptera records in assessing the conservation status of wetlands. pp. 8–18 in: Luff, M. L. (ed.) *The use of invertebrates in site assessment for conservation*. University of Newcastle, Newcastle.

Foster, G. N. 1996. WETSCORE revisited—the value of values and scores of scores. pp. 93–96 in: Eyre, M. D. (ed.) *Environmental monitoring, surveillance and conservation using invertebrates*. EMS Publications, Newcastle.

Foster, G. N., Foster, A. P., Eyre, M. D. & Bilton, D. T. 1990. Classification of water beetle assemblages in arable fenland and ranking sites in relation to conservation value. *Freshwater Biology* **22**: 343–354.

Foster, G. N. & Eyre, M. D. 1992. *Classification and ranking of water beetle communities*. Joint Nature Conservation Committee, Peterborough.

Gaston, K. J. 1994. *Rarity*. Chapman and Hall, London.

Goldsmith, F. B. 1991. The selection of protected areas. pp. 273–291 in Spellerberg, I. F., Goldsmith, F. B. & Morris, M. G. (eds.) *The scientific management of temperate communities for conservation*. Blackwell Science, Oxford.

Hammond, P. M. & Harding, P. T. 1991. Saproxylic invertebrate assemblages in British woodlands: their conservation significance and its evaluation. pp. 30–37 in: Read, H. J. (ed.) *Pollard and veteran tree management*. Richmond Publishing, Slough.

Hanski, I. 1982. Dynamics of regional distribution: the core and satellite species hypothesis. *Oikos* **38**: 210–221.

Howard, P. C. 1991. *Nature conservation in Uganda's tropical forest reserves*. World Conservation Union, Gland, Switzerland.

ICBP 1992. *Putting biodiversity on the map: priority areas for global conservation*. International Council for Bird Preservation, Cambridge.

Jefferson, R. G. 1984. Quarries and wildlife conservation in the Yorkshire Wolds, England. *Biological Conservation* **29**: 363–380.

Lott, D. A., Butterfield, J. & Jeeves, M. B. 1999. Terrestrial invertebrates in site assessment: a local perspective. *British Journal of Entomology and Natural History* **12**: 96–104.

Luff, M. L. 1996. Environmental assessments using ground beetles (Carabidae) and pitfall traps. pp. 42–47 in: Eyre, M. D. (ed.) *Environmental monitoring, surveillance and conservation using invertebrates*. EMS Publications, Newcastle.

Palmer, M. A. 1999. The application of biogeographical zonation and biodiversity assessment to the conservation of freshwater habitats in Great Britain. *Aquatic Conservation: Marine and Freshwater Ecosystems* **9**: 179–208.

Prendergast, J. R., Quinn, R. M., Lawton, J. H., Eversham, B. C. & Gibbons, D. W. 1993a. Rare species, the coincidence of diversity hotspots and conservation strategies. *Nature*, Lond. **365**: 335–337.

Prendergast, J. R., Wood, S. N., Lawton, J. H. & Eversham, B. C. 1993b. Correcting for variation in recording effort in analyses of diversity hotspots. *Biodiversity Letters* **1**: 39–53.

Pressey, R. L. & Nicholls, A. O. 1989. Efficiency in conservation evaluation: scoring versus iterative approaches. *Biological Conservation* **50**: 199–218.

Rabinowitz, D. 1981. Seven forms of rarity. pp. 205–217 in Synge, H. (ed.) *The biological aspects of rare plant conservation*. Wiley, New York.

Ratcliffe, D. A. (ed.) 1977. *A nature conservation review*. 2 vols. Cambridge University Press, Cambridge.

Rich, T. C. G. 1997. Is *ad hoc* good enough? *Transactions of the Suffolk Naturalists' Society* **33**: 14–21.

Smith, F. D. M., May, R. M. & Harvey, P. H. 1994. Geographical ranges of Australian mammals. *Journal of Animal Ecology* **63**: 441–450.

Terborgh, J. & Winter, B. 1983. A method for siting parks and reserves with special reference to Colombia and Ecuador. *Biological Conservation* **27**: 45–58.

Turpie, J. K. 1995. Prioritizing South African estuaries for conservation: a practical example using waterbirds. *Biological Conservation* **74**: 175–185.

Usher, M. B. 1986. Wildlife conservation evaluation: attributes, criteria and values. pp. 3–44 in: Usher, M. B. (ed.) *Wildlife conservation evaluation*. Chapman and Hall, London.

Williams, P. H. 1982. The distribution and decline of British bumble bees (*Bombus* Latr.). *Journal of Apicultural Research* **21**: 236–245.

Williams, P. H. 1988. Habitat use by bumble bees (*Bombus* spp.). *Ecological Entomology* **13**: 223–237.

Williams, P. H. 1989. Why are there so many species of bumble bees at Dungeness? *Botanical Journal of the Linnean Society* **101**: 31–44.

Williams, P. H. 1996. *Worldmap 4 Windows: software and help document 4.1*. Distributed privately, London and http://www.nhm.ac.uk/science projects/worldmap.

Williams, P. H. 1998. Key sites for conservation: area-selection methods for biodiversity. pp. 211–249 in: Mace, G. M., Balmford, A., Ginsberg, J. R. (eds) *Conservation in a changing world*. Cambridge University Press, Cambridge.

Williams, P., Gibbons, D., Margules, C., Rebelo, A., Humphries, C. & Pressey, R. 1996. A comparison of richness hotspots, rarity hotspots and complementary areas for conserving diversity using British birds. *Conservation Biology* **10**: 155–174.

Williams, P. H., Prance, G. T., Humphries, C. J. & Edwards, K. S. 1996. Promise and problems in applying quantitative complementary areas for representing the diversity of some Neotropical plants (families Dichapetalaceae, Lecythidaceae, Caryocaraceae, Chrysobalanaceae and Proteaceae). *Biological Journal of the Linnean Society* **58**: 125–157.

A NEW BUTTERFLY GENUS, SPECIES AND SUBSPECIES FROM THE SOLOMON ISLANDS (LEPIDOPTERA: LYCAENIDAE, POLYOMMATINI)

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Abstract. *Solomona* gen. n. is erected for new polyommatine taxa from the Solomon Islands: *Solomona sutakiki* sp. n. (Guadalcanal) and *S. sutakiki malaitae* ssp. n. (Malaita).

INTRODUCTION

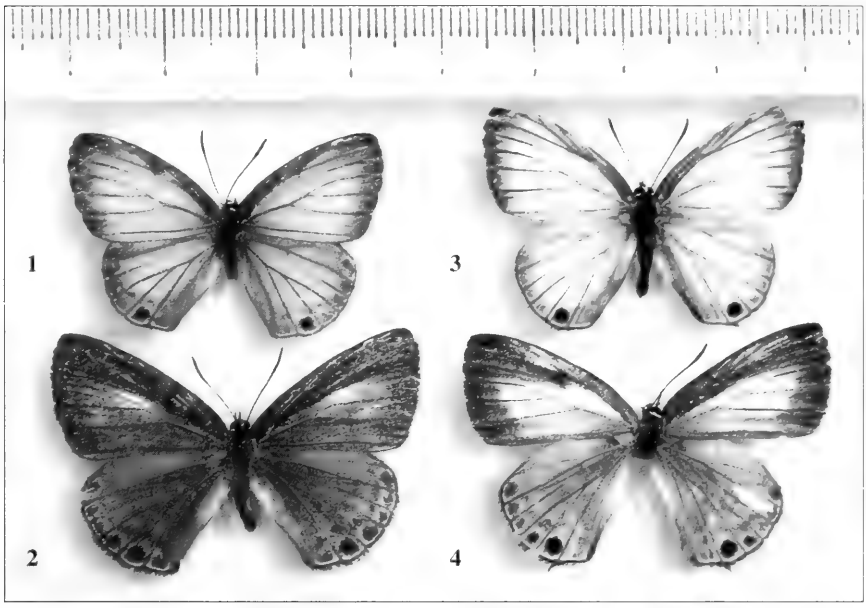
During field work for a study of Solomon Islands butterflies (Tennent, 1998), a series of undescribed polyommatine lycaenids, not conforming to any known genus, were collected on Guadalcanal island. Further specimens, originating from Malaita island, were subsequently discovered in the collections of Dodo Creek Research Station, Honiara, and The Natural History Museum, London (BMNH). Structure of the male genitalia suggest affinity with *Tartesa* Hirowatari 1992 (T. Hirowatari, pers. comm.; J. N. Eliot, pers. comm.), recently separated from *Nacaduba* Moore 1881, primarily on the basis of features of the female genitalia (Hirowatari, 1992: 23) for two Solomon Islands species: *T. astarte* Butler and *T. ugiensis* Druce. Despite considerable diversity found in the genus *Nacaduba*, the new butterflies have little obvious affinity with either *Nacaduba* or *Tartesa* in external appearance. The genitalia of the female, whilst clearly related to both, are significantly different from either and warrant erection of a new genus (Hirowatari, pers. comm.).

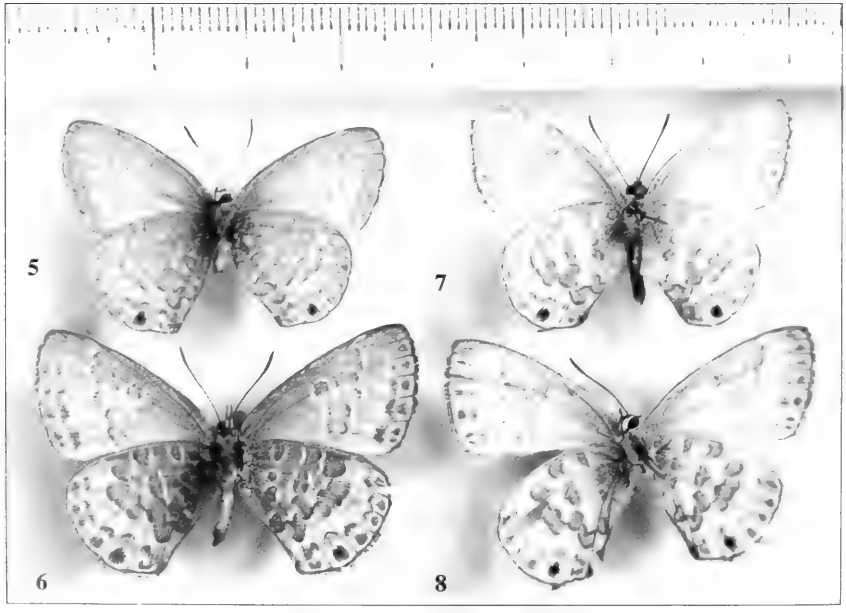
Solomona gen. n.

Description. Differs from *Nacaduba* and *Tartesa* in its relatively large size, wing markings and female genitalia. Wing venation as *Nacaduba Tartesa*; hindwing tail short, 'stumpy' (longer, filamentous in *Nacaduba*); male genitalia similar to *Tartesa*; female genitalia superficially similar to *Nacaduba Tartesa*; signa absent (bursa with pair of prominent horn-like signa in *Nacaduba*; absent in *Tartesa*); corpus bursae small, elongated, simple (larger, globular in *Nacaduba*; very large, prominently swollen dorsally in *Tartesa*); ductus seminalis uniformly slender, with point of attachment to bursa copulatrix approximately one-third of distance from ostium (swollen at point of attachment in *Nacaduba*; slender, point of attachment nearly at centre of dorsal surface of bursa copulatrix in *Tartesa*); ostium opens between 7th and 8th abdominal segment as in most other Polyommatini (middle of 8th segment in *Nacaduba* [but somewhat variable; J. N. Eliot, pers. comm.] and *Tartesa*). Type species: *Solomona sutakiki* sp. n.

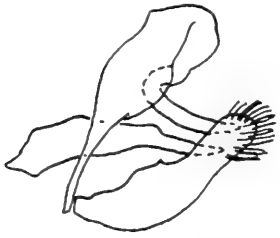
Solomona sutakiki sp. n. (Figs 1, 2, 5, 6, 9, 10)

Description. Male forewing length 18 mm; upperside pale silvery-white; wing fringes brown; borders brown; veins heavily lined brown; hindwing upperside with prominent black marginal spot in space 2, very faintly bordered blue-green anteriorly; underside pale brown with typical lycaenid arrangements of pale lines, enclosing slightly darker irregular median and postmedian bands; marginal series of triangular brown markings enclosed in paler band; prominent black spot in space 2,





Figs 1, 2, 5, 6: *Solomona sutakiki sutakiki* 1, 5 ♂ (holotype); 2, 6, ♀ (paratype); 3, 4, 7, 8: *S. s. malaitae* 3, 7 ♂ (holotype); 4, 8, ♀ (paratype).



9a

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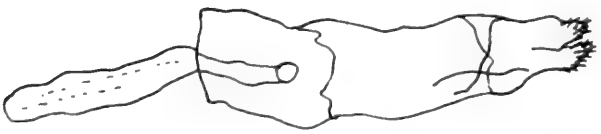
10a



10b

Figs 9a e: *S. s. sutakiki* (holotype), male genitalia; 9a, genitalia (lateral view); 9b, uncus (posterior view); 9c, valvae (posterior view); 9d, right valva (lateral view); 9e, aedeagus (lateral view); 10a b: *S. s. sutakiki* (paratype), female genitalia; 10a, genitalia (lateral view); 10b, genitalia (ventral view).

narrowly bordered iridescent blue-green and orange posteriorly; vestigial blue-green and orange markings in space 1b; trace of tornal black spot and iridescent blue-green markings; genitalia (Fig. 9) similar to *Tartesa*; dorsal portion of aedeagus membraneous (a feature apparently otherwise restricted to *Tartesa*); valva distinctive, with two sharp lateral projections. Female forewing length 22 mm; upperside dull grey-brown; forewing upperside with indistinct white postdiscal patch; hindwing upperside with prominent black spot in space 2; underside as male; for genitalia (Fig. 10) see notes under *Solomona* gen. n. (above).

Distribution. Guadalcanal island.

Type material. HOLOTYPE ♂: Solomon Islands, Guadalcanal, north of mount Popomanaseu, river Sutakiki, 500 m, 2.viii.1996, W. J. Tennent (gen. prep. BMNH (V) 5148) (BMNH); PARATYPES: 2 ♀♀, same data (inc. gen. prep. BMNH (V) 5149); 2 ♂♂, 3 ♀♀, Guadalcanal, Gold Ridge village, 580 m, 5.viii.1996, W. J. Tennent; 1 ♀ Guadalcanal, south coast, Chocho to Mbabanakira, SL, 6.xi.1997, W. J. Tennent (all BMNH).

Solomona sutakiki malaitae ssp. n. (Figs 3, 4, 7, 8)

Description. Male forewing length 18 mm; resembles *S. s. sutakiki*; upperside paler, veins less heavily lined brown; underside like *S. s. sutakiki*; ground colour almost white, giving more contrasted appearance; genitalia like *S. s. sutakiki*. Female resembles *S. s. sutakiki*; forewing upperside white patch extensive, leaving wide brown margin at costa and outer margin; hindwing upperside paler; prominent black marginal spot in space 2; obscure spot in space 3; underside like male.

Distribution. Malaita island.

Type material. HOLOTYPE ♂, Solomon Islands, Malaita, 3.7 km inland from Auki, xii.1983, AGW [= A G Worsnop] (BMNH); PARATYPES, 1 ♂, 1 ♀, same data (BMNH); 1 ♂, 1 ♀, same data (Dodo Creek Research Station, Honiara).

Acknowledgements

Mr Moses Biliki, Ministry of Forests, Environment and Conservation, Honiara, supported the author's research in the Solomon Islands and Mrs Audrey Ruza, Ministry of Education and Human Resources Development, Honiara, issued research permits for field work. Assistance was also kindly provided by Mr Tim and Mrs Relma Turner (Honiara); Mrs Ruth Liliquola, Dodo Creek Research Station, Honiara; Dr Jeremy Holloway, Department of Entomology, The Natural History Museum, London; Mrs Alison Worsnop (Darwin). The author's first field visit to the Solomon Islands in 1996 was partially funded by the Exploration Board of Imperial College of Science, Technology and Medicine, London, The Linnean Society, London and the Royal Entomological Society, London. Significant funding for this and subsequent field visits was provided by the Trustees of the Godman Exploration Fund. Mr Martin Honey, Department of Entomology, The Natural History Museum, London, kindly dissected female genitalia; Dr Toshiya Hirowatari (Japan) and Lt Col. John Eliot (UK) made valuable comments on a draft of this paper.

References

Hirowatari, T. 1992. A generic classification of the Tribe Polyommatini of the Oriental and Australian Regions (Lepidoptera, Lycaenidae, Polyommatinae). *Bulletin University Osaka Prefecture* (B) **44** (Supplement): 1–102.

Tennent, W. J. 1998. *Biodiversity and biogeography of Solomon Islands butterflies*. Unpublished MSc Thesis, University of Kent at Canterbury.

ON THE HISTORY AND DISTRIBUTION OF *ATHYSANUS ARGENTARIUS* METCALF (HEM.: CICADELLIDAE) IN BRITAIN

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Abstract. In July, 1999, a single specimen of the large cicadellid leaf-hopper *Athysanus argentarius* Metcalf was collected, together with aphids, psyllids and other small insects, at an altitude of approximately 230 m above ground level. The circumstances surrounding this unusual event are discussed, together with an account of the history and recent changes in distribution of this species in Britain.

INTRODUCTION

On 8.vii.1999 a large and apparently unfamiliar cicadellid leaf-hopper was collected at an estimated altitude of 230 m with other insects during a period (7.00–13.00 h) of aerial netting carried out by one of us (J.W.C.) and colleagues from the NRI Radar Unit and the Meteorological Research Unit, RAF Cardington, Bedfordshire.

Aerial arthropods were sampled almost continuously for a 10-day period during July 1999 by flying a helium-filled balloon with a fine mesh net (aperture 0.64 m^2) suspended underneath. The net sampled at approximately 200 m, the height varying slightly with changes in wind speed. This work was part of an ongoing 2 year study using entomological radar to monitor insect movement at height. Netting was used to calibrate the radar data.

The cicadellid was determined by one of us (M.A.S.) as *Athysanus argentarius* Metcalf. It is a large brightly marked species, 7–8 mm in length, with fully developed wings. However, in spite of being fully winged it is not often observed to take flight. Instead, it is able to jump distances in excess of one metre, especially if disturbed. As the great majority of Hemiptera collected at altitude are small, frail species, usually aphids, psyllids and small macropterous delphacids (Chapman, unpublished data), the finding of *A. argentarius* amongst aerial plankton of 200 m over Bedfordshire is extraordinary.

Interest in this species was first aroused in 1956 when the late Lt. Col. C. A. W. Duffield took a series amongst long grass at Sandwich, Kent. Two weeks later he was surprised to find a second colony at Dungeness. Being quite unfamiliar with this leaf-hopper he sent specimens to R. J. Izzard at the Natural History Museum, London. The reply was intriguing. "[*Athysanus argentarius* is] a continental species found in Central and Northern Europe on low plants in damp places and in Siberia and Turkestan." There were at that time no specimens in the National Collection, either from this country or abroad. Lt. Col. Duffield (1957) published his finding with the comment: "It is extraordinary that such a large and conspicuous 'hopper' should have eluded capture before. If it was a new arrival it is equally extraordinary that it should appear in two localities so far apart." Later that year Lt. Col. Duffield discussed this problem with one of us (M.A.S.) and subsequent research (Salmon, 1959) revealed that *A. argentarius* was not new to Britain. In fact, the Revd Thomas A. Marshall had taken it during the middle years of the nineteenth century, although

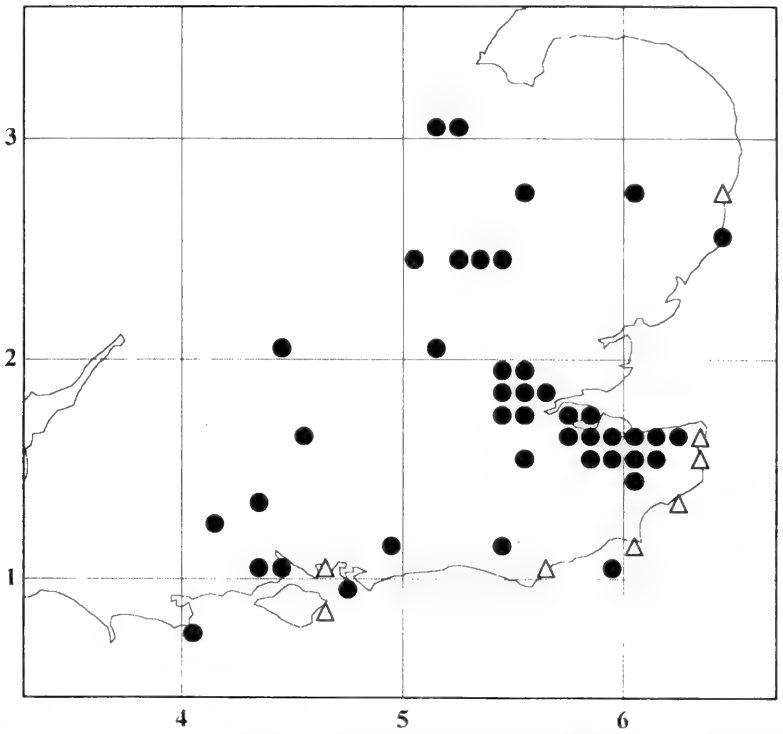

Figure 1. Distribution of *Athysanus argentarius* Metcalf. Triangles refer to records before 1960; circles refer to records from 1960 onwards. Numbers along axes refer to 100-km intervals on the National Grid.

his published account (Marshall, 1866) had apparently been overlooked or ignored by all subsequent workers. Today, this seems surprising as his record appeared in the *Entomologist's Monthly Magazine*, the journal most likely to have been read at that time by those interested in the Hemiptera. It is just as surprising to learn that Marshall had *also* found his specimens at Sandwich. "Apparently an unusual species in this country, but once taken by me in abundance on water plants growing in a shallow pond by the side of the road from Ramsgate to Sandwich, in September."

Since 1956 *A. argentarius* has been recorded more widely and appears to be increasing its range and distribution (Stewart, 1999). A similar increase has been reported also from Denmark (Kristensen, 1965). Twenty-five years ago all British records were from coastal and estuarine marshes, but recent findings indicate that *A. argentarius* has spread inland and can be found on grassland as well as palustrine biotopes. In continental Europe it inhabits damp meadows and clover fields (Vilbaste, 1974). The present distribution includes: Suffolk: Walberswick (H. W. Daltry, 1956), Snape Warren (P. Kirby, 1984); Essex: Epping Forest (J. H. Bratton, 1985), Roding Valley (M. Hanson, 1985), Mucking Heath (P. R. Harvey, 1990), Colne Estuary NNR (P. Kirby, 1997), South Weald Country Park (P. Kirby, 1988), Goldhanger (P. Kirby, 1986); Kent: Sandwich and Dungeness (C. A. W. Duffield,

1956), Ridham Marsh (P. Kirby, 1990); Sussex: Pevensey Bay (W. J. Le Quesne, 1957); Hampshire: Portchester (W. J. Le Quesne, 1957), Leckford (M. A. Salmon, 1998); Isle of Wight: St Helens (W. J. Le Quesne, 1965); Wiltshire: Charlton All Saints (M. A. Salmon, 1999); Berkshire: Chamberhouse Farm (P. Kirby, 1997); Bedfordshire: Sandy Heath (P. Kirby, 1996); Cambridgeshire: Fowlmere (A. J. A. Stewart), Wicken Fen (P. J. Hodge), Shepreth L-Moor (P. Kirby, 1987); Oxfordshire: Wytham Wood (M. R. Wilson, 1998); Hertfordshire: Bricket Wood and Broxbourne (A. J. A. Stewart); Northamptonshire: Castor Hanglands NNR (P. Kirby, 1999), Dogsthorpe (P. Kirby, 1998). The present aerial record from Cardington, Bedfordshire is unique. It suggests that *A. argentarius* is not only capable of flight but may have a migratory behaviour that facilitates long-range wind-borne dispersal at altitude, as indicated by our finding. However, it was not noted in the extensive survey in France reported by della Giustina & Balasse (1999).

Acknowledgements

We are extremely grateful to Alan Stewart (University of Sussex) for the distribution map and for helpful advice, and to Allan Morton for the DMAP programme used to produce the distribution map. We thank Peter Kirby for helpful criticism and details of recent distribution records. JWC's studies are funded by a ROPA grant from the Biotechnology and Biological Sciences Research Council of the United Kingdom. We would like to thank Don Reynolds, Alan Smith, Joe Riley and Ian Woiwod for technical assistance with the aerial netting, and David Bamber of the Meteorological Research Unit at Cardington for permission to carry out the work.

References

Duffield, C. A. W. 1957. British Homoptera -two new records and one hitherto little known. *Transactions of the Kent Field Club* **1**: 4–8.

della Giustina, W. & Balasse, H. 1999. Gone with the wind: Homoptera: Auchenorrhyncha collected by the French network of suction traps in 1994. *Marburger Entomologische Publikationen* **3**(1): 7–92.

Kristensen, N. P. 1965. Cikader (Homoptera auchenorrhyncha) fra Hansted-reservatet. *Entomologiske Meddelelser* **30**: 269–287.

Le Quesne, W. J. 1965. *Athysanus argentarius* Metcalf (Hem., Cicadellidae) in the Isle of Wight. *Entomologist's Monthly Magazine* **101**: 288.

Marshall, T. A. 1866. An essay towards a knowledge of British Homoptera. *Entomologist's Monthly Magazine* **3**: 9–10.

Salmon, M. A. 1959. On the rediscovery of *Athysanus argentatus* (Fab.) (Hom. Cicadellidae) in Britain. *Entomologist's Gazette* **10**: 51–53.

Stewart, A. J. A. 1999. Twenty years of recording the distribution of Auchenorrhyncha in Britain and Ireland: progress, achievements and prospects (Hemiptera). *Reichenbachia* **33**: 207–214.

Vilbaste, J. 1974. Preliminary list of Homoptera-Cicadinea of Latvia and Lithuania. *Eesti NSV Teaduste Akadeemia Toimetised* **23**: 131–163.

SHORT COMMUNICATION

An onion aphid, *Neotoxoptera formosana* (Takahashi) (Hemiptera: Aphididae), new to Britain.—On 27.ix.99 I noticed that plants of Welsh onion, *Allium fistulosus*, growing in the Model Vegetable Garden at RHS Garden, Wisley, Surrey were heavily infested with a black aphid. As onions are not usually troubled by aphids samples were taken and using the key for aphids on chives/onions in Blackman & Eastop (1985), they were identified as *Neotoxoptera formosana* (Takahashi) (Hemiptera: Aphididae). This book gives its distribution as Japan, China, Taiwan, Korea, Australia, New Zealand, Hawaii and North America, where it attacks growing plants of Allium spp. and also attacks onion bulbs in store. Samples of the aphid were sent to the Invertebrate Identification Team at the Central Science Laboratory, Sand Hutton, York where the aphid's identity was confirmed by Roger Hammond. They were aware of only one previous European record when the aphid was found in 1994 on bulb onions imported into Finland from Holland. The Wisley record appears to be the first time N. formosana has been detected on growing plants in Europe.

The Welsh onions were being grown in a plastic tub 40 cm in diameter. A nearby similar tub containing garlic chives (*Allium tuberosum*) was also infested to a lesser extent, as were leeks (*Allium porrum*) growing in the open soil. On the welsh onion and garlic chives the aphids were feeding on the foliage and flower heads. At the request of the Plant Health and Seed Inspectorate the Welsh onions were incinerated and the other host plants sprayed with insecticide to eradicate the aphid. Blackman & Eastop (1985) describe the apterous form of the aphid as 1.6–2.3 mm long, oval, shining magenta red to almost black. The antennae are black at the base and tip, the femora are black except at the bases, and the siphunculi are dark but paler than the body. The aphids seen at Wisley were black rather than magenta red. The winged forms are described as very dark red to black with the wing veins heavily black bordered. *N. formosana* is believed to be an anholocyclic species that lives on *Allium* species without migrating to an alternative type of host plant.

The origin of the Wisley infestation is unknown. The gardener responsible for the Model Vegetable Garden had noticed aphids on the Welsh onions earlier in the summer and had applied an insecticide without realising that this was something other than ordinary blackfly. The stock of Welsh onion had been supplied to Wisley in 1997 by a member of staff from his garden at Reading, Berks. He was not aware of any aphid problems on the plants at that time and none were noticed at Wisley during 1997–8. He has since moved house and so no longer has access to that garden. Wisley Garden grows a wide range of ornamental *Allium* species in addition to the vegetable types and there is the possibility that the aphid may have arrived on bulbs of these. During the 2000 growing season, ornamental and vegetable *Allium* species at Wisely will be examined to see if further infestations of the aphid can be found.

I am grateful to Roger Hammond for confirming the aphid's identity and to Beverly Barlett of PHSI who visited Wisley and gave advice on the aphid's eradication. A. J. HALSTEAD, RHS Garden, Wisley, Woking, Surrey GU23 6QB.

REFERENCE

Blackman, R. L. & Eastop, V. F. 1985. Aphids on the world's crops: an identification guide. John Wiley & Sons, Chichester.

SCHIZOTETRANYCHUS CELARIUS (BANKS) (ACARI: PROSTIGMATA) A MITE PEST OF BAMBOO; FIRST RECORDS FOR BRITAIN AND TWO NEW HOST RECORDS

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Abstract. Specimens of *Schizotetranychus celarius* (Banks) were discovered in August 1995 on a single bamboo plant (*Sasaella masmuneana*) in a private garden in Surrey. Further live specimens were collected from the same site in April 1998. A survey conducted by the Plant Heath and Seeds Inspectorate (PHSI) discovered the mite at sites in Hampshire, Norfolk and Sussex. These are the first confirmed records of this mite in Britain, and it has since been intercepted several times on imported bamboo plants. Two new hosts are recorded, *S. masmuneana* and *Phyllostachys aurea*.

INTRODUCTION

Hardy species of bamboo are available in a variety of colours and forms, and as such are popular garden ornamentals, frequently used in amenity planting. They can be purchased from a large number of outlets including garden centres and specialist growers; they are also regularly imported from, or via, continental Europe.

A sample of leaves from a pot-grown bamboo, *Sasaella masmuneana* (Makino) Hatusima & Huroi *var.* 'Albostriata', collected on 21.viii.1995 from a private garden near Guildford, Surrey, was sent to the Central Science Laboratory (CSL) by Andrew Halstead of the Royal Horticultural Society (RHS), Wisley. Examination of the sample revealed active colonies of mites consisting of all life stages, inhabiting the areas between the veins on the under-surfaces of most of the leaves. Each colony was covered by a sheet of white silk with a small opening at each end. These structures are often referred to as 'nests' (Saito & Ueno, 1979). The nests varied in size, measuring 2–3 mm in width depending on the vein spacing, and up to 25 mm in length. On the more heavily infested leaves, nests filled all the available spaces between the veins. The feeding activity of the mites resulted in yellow chlorotic patches developing on the upper surfaces of the leaves above the nests, marring the appearance of the plant. The mites were identified as *Schizotetranychus celarius*, a new record for Britain, and on a new host *S. masmuneana*.

The *S. masmuneana* plant on which the mites were found had been purchased in 1994. A second sample of live specimens collected from the same plant by Andrew Halstead was received at CSL on 1.iv.1998. The mites had therefore bred and survived outdoors for at least four winters in our climate. Some growers were aware of the presence of mites on bamboos prior to 1995, and specialist bamboo growers were made aware of this pest (Stapleton, 1996).

IDENTIFICATION AND BIOLOGY

The genus *Schizotetranychus* Trägårdh occurs throughout the world and at present contains 114 described species (Bolland, Gutierrez & Flechtmann, 1998), many of which occur on monocotyledonous plants, particularly grasses and bamboos (Pritchard & Baker, 1955). Some species are considered to be economically important crop pests e.g. *S. andropogoni* (Hirst, 1926) on sugar cane (*Saccharum officinarum*), *S. asparagi* (Oudemans, 1928) on pineapple (*Ananas comosus* (L.)) and

S. baltazari Rimando, 1962 on *Citrus* spp. (Jeppson, Keifer & Baker, 1975). Of the 18 species recorded on bamboos, at least five produce the characteristic silk nests. Two species of *Schizotetranychus* are recorded in the checklist of the British Acari (Turk, 1953), namely *S. schizopus* (Zacher) on *Salix* spp. and *S. viburni* (Koch) on *Viburnum opulus* L. The latter species is synonymous with *Tetranychus urticae* Koch, 1836 (Pritchard & Baker, 1955). Since 1953, no other species of *Schizotetranychus* have been added to the British faunal list.

Superficially, members of the genus *Shizotetranychus* are typically tetranychid in appearance. They are differentiated from other genera by the tarsi that each bear a large pair of apical claws formed from the enlargements of the ventro-lateral empodial hairs, and by possessing 10 pairs of dorsal opisthosomal setae.

Adult *S. celarius* measure slightly less than 0.5 mm in length, are pale green to straw-coloured, slightly dorso-ventrally flattened (presumably an adaptation to living under the silken canopy of the nests) and bear two red spots located dorso-laterally, one on either side of the propodosoma. The immatures are opaque to translucent white. Under laboratory conditions, 25 °C, 50–60% RH and a light to dark regime of 15L-9D, the developmental time from egg to adult was found to be approximately 14 days (Saitô & Ueno, 1979). This species is unusual as the adult mites actively defend the nests and offspring from predation by phytoseiid mites (Saitô, 1986; 1990a).

The complex *S. celarius* is considered to consist of three closely related species (Saitô, 1990b; Okasabe, Saitô & Sakagami, 1993), namely *S. celarius* (Banks), *S. miscanthi* Saitô and *S. longus* Saitô. The three are separated morphologically by differences in the lengths and positions of some of the dorsal body setae and the form of the empodial claws. It has been shown that the length of the dorsal setae is related to the size of the nests (Saitô & Takahashi, 1980). The specimens collected near Guildford were all typical of the species *celarius*.

Known distribution and hosts

S. celarius was first described from specimens collected off bamboo in Florida, USA (Banks, 1917), and has subsequently been recorded in other states of USA, including Hawaii. The species has also been recorded from Australia, China, France, Hong Kong, Japan, Taiwan and The Netherlands (Bolland, Gutierrez & Flechtmann, 1998). In Japan *S. celarius* is an occasional pest of rice (*Oryza sativa* L.) (Jeppson, Keifer & Baker, 1975). Other recorded hosts are: *Bambusa* sp., *Ficus pumila* L., *Miscanthus sinensis* Andersson, *Phyllostachys bambusoides* Siebold & Zuccarini, *P. mankinoi* Hayata, *P. nigra* (Loddiges ex Lindley) Munro, *Phyllostachys* sp., *Pleioblastus hindsii* (Munro) Nakai, *P. variegatus* (Siebold ex Miquel) Makino, *Pleioblastus* sp. Poaceae, *Saccharum offinicarum* L., *S. spontaneum* L., *Sasa kurilensis* (Ruprecht) Makino & Shibata, *S. nipponica* (Makino) Makino & Shibata and *S. senanensis* (Franchet & Savatier) Rehder. (Purseglove, 1972; Graf, 1974; Mabberley, 1990; Bolland, Gutierrez & Flechtmann, 1998; Ohrnberger, 1999).

During 1998/99 inspectors from the PHSI began surveying nursery stocks and imported plants in order to determine the distribution of this species in Britain. To date *S. celarius* appears to be of limited distribution, having been found in Hampshire, Norfolk, Surrey and Sussex.

Specimens collected in Sussex on 3.xii.1998 were notable as they were on a new bamboo host, *Phyllostachys aurea* Carrière ex A. & C. Rivière, that had been imported from Italy where neither *S. celarius* nor the genus *Schizotetranychus*, as currently recognised (Bolland, Gutierrez & Flechtmann, 1998), had been recorded previously.

Conclusion

Given the availability of suitable hosts, and the extent of the trade in these plants from countries where *S. celarius* is known to occur, this and other species of bamboo-inhabiting *Schizotetranychus* may be more widely distributed in Britain and continental Europe than the current records suggest. Surveying by the PHSI ceased at the end of August 1999. Any findings should be reported to the PHSI via the nearest office of the Ministry of Agriculture, Fisheries and Food.

Three slides consisting of 11 females and six males, and more than 100 preserved specimens are deposited at the CSL, and two slides consisting of seven females and four males are deposited in the collections of The Natural History Museum, London.

Acknowledgments

Thanks to Andrew Halstead (RHS) for sending in the original and subsequent specimens, Dr Yutaka Saitô of the Institute of Applied Zoology, Hokkaido University, Japan for confirming my identifications and the PHSI inspectors for their efforts.

References

Banks, N. 1917. New mites, mostly economic (Arach., Acar.) *Entomological News* **28**: 193–199, pls. 14, 15.

Bolland, H. R., Gutierrez, J. & Flechtmann, C. H. W. 1998. *World Catalogue of the spider mite family* (Acari: Tetranychidae). pp. 392. Brill, Leiden.

Graf, A. B. 1974. Exotica Series 3: 7th Ed. *Pictorial Cyclopedia of Exotic Plants from Tropical and Near-tropic Regions*. pp. 1833. Roehrs, USA.

Jeppson, L. R., Keifer, H. H., Baker, E. W. 1975. *Mites Injurious to Economic Plants*. Berkeley, University of California Press. pp. 614.

Mabberley, D. J. 1990. *The Plant-Book: A portable dictionary of the higher plants*. Cambridge University Press. pp. 707.

Ohrnberger, D. 1999. *The bamboos of the world: annotated nomenclature and literature of the species and the higher and lower taxa*. Elsevier. pp. 585.

Osakabe, Mh., Saitô, Y. & Sakagami, Y. 1993. Protein differences detected by two-dimensional electrophoresis in the species complex of *Schizotetranychus celarius* (Banks). *Experimental & Applied Acarology* **17**: 757–764.

Pritchard, A. E. & Baker, E. W. 1955. *A revision of the spider mite family Tetranychidae*. Memoirs of the Pacific Coast Entomological Society. Vol. 2. pp. 472.

Purseglove, J. W. 1972. *Tropical crops: Monocotyledons* Vol. 1. Longman. pp. 334.

Saitô, Y. 1986. Biparental defense in a spider mite (Acari: Tetranychidae) infesting *Sasa* bamboo. *Behavioral Ecology & Sociobiology* **18**: 377–386.

Saitô, Y. 1990a. Life-history and feeding habit of *Typhlodromus bambusae*, a specific predator of *Schizotetranychus celarius* (Acari: Phytoseiidae: Tetranychidae). *Experimental & Applied Acarology* **10**: 45–51.

Saitô, Y. 1990b. Two New Mite Species of the *Schizotetranychus celarius* Complex (Acari: Tetranychidae). *Applied Entomology & Zoology* **25**(3): 389–396.

Saitô, Y. & Takahashi, K. 1980. Study on Variation of *Schizotetranychus celarius* (Banks). I. Preliminary Descriptions of Morphological and Life Type Variation. *Japanese Journal of Applied Entomology & Zoology* **24**: 62–70.

Saitô, Y. & Ueno, J. U. 1979. Life History Studies on *Schizotetranychus celarius* (Banks) and *Aponychus corpuzae* Rimando as compared with other Tetranychid Mite Species (Acarina: Tetranychidae). *Applied Entomology & Zoology* **14**(14): 445–452.

Stapleton, C. 1996. Mite alert. *The Bamboo Society Newsletter* 24.

Turk, F. A. 1953. I. A Synonomic Catalogue of British Acari: Part I. *The Annals and Magazine of Natural History*, **ser. 12** vol. vi. 1–26.

SHORT COMMUNICATION

A pain in the anal appendages – Phoretic or parasitic mites are commonly found on invertebrates of all types, usually attached to the membranes of the leg joints or between the body sections, but I was bemused to find this fly (Fig. 1) with a heavy mite load attached to the very tip of its abdomen. The fly was kindly identified by Peter Chandler as a female of the muscid *Potamia littoralis* (R.-D.) (formerly *Dendrophaonia querceti* Bouché). This species is often found on tree trunks, but its predatory larvae are recorded from various habitats including bird and hornet nests and dung. The fly probably picked up the mites while at rest, most likely soon after emergence from its pupa as it dried out. Mites are often disregarded as of minor inconvenience to the insects on which they hitch a ride, even if they are sipping haemolymph, but one wonders whether, on this occasion, the whole mechanics of mating and egg laying would be interfered with by the presence of what is virtually a living chastity belt!—RICHARD A. JONES, 135 Friern Road, East Dulwich, London SE22 0AZ.

Fig. 1. *Potamia littoralis* with attached mites.

THE STATUS AND ECOLOGY OF THE HORNET MOTH, *SESIA APIFORMIS* (CLERCK) (LEPIDOPTERA: SESIIDAE), IN SUBURBAN SOUTH LONDON

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Abstract. The hornet moth (*Sesia apiformis* Clerck) is considered scarce in England but is probably under-recorded. The aim of this study was to establish its status in the south London Boroughs of Sutton and Merton. Results indicated that the moth was much more common in Sutton than Merton but may be declining. Contrary to previous thinking, trees surrounded by vegetation were more heavily infested than those devoid of basal vegetation. This may be explained by heavy predation pressure or selection of sub-optimal trees. Management implications are also discussed.

Introduction

The hornet moth (*Sesia apiformis* Clerck) is probably under-recorded but is still afforded nationally scarce status notable B (recorded from fewer than 100 10 km squares). It is locally widespread in central, southern and south-eastern parts of England. In London, Plant (1993) could only list six records since 1980 and so considered it an 'extremely local resident' (category 4). In Surrey, Collins (1997) found the moth only in the north-east of the county commenting 'recent systematic fieldwork in the streets of south London has revealed it to be locally common'. This paper gives more details of that fieldwork.

Methods

Trees were thoroughly searched each year for the characteristic exit holes and protruding exuviae in the London boroughs of Sutton (since 1994) and Merton (since 1995). A site location list of all black poplar trees known to the local authorities was obtained from their Streets and Amenity Tree Management System (STEMS) database. For Sutton, this was obtained in 1996, so not all the trees were checked in earlier years. Sites with many trees were checked when most of the moths would have emerged (late July onwards); other sites were checked more than once, in which case, exuviae were removed to avoid double counting.

The hybrid *serotina* has been widely planted in both boroughs and accounts for most of the black poplar trees. The hybrid *italica* (Lombardy poplar) is the next most frequently planted and was never seen to contain exit holes; it was only checked on an *ad hoc* basis. Recently planted (< 10 years old) black poplars and white poplars were only checked when they occurred with mature black poplars.

Results

The first exuviae found on Sutton trees were on 14.vi.1994, 13.vi.1995, 19.vi.1996, 14.vi.1997 and 10.vi.1998. The dates for Merton broadly concur with the exception

of 14.v in 1997. These data suggest that in most years emergence began in the second week of June but can occur in May. The date of the last exuviae was difficult to determine since exuviae were being found into August, from moths which may have emerged much earlier. However, at some of the more regularly checked sites, emergence was recorded after 19.vii in 1996 and 1998.

Tables 1 and 2 list for Sutton and Merton the location of poplar trees, excluding Lombardy poplar, and the number of exuviae found each year. Fig. 1 maps the distribution. Over the study period, evidence of current but not necessarily continuous infestation was found at 22 of 28 sites (79%) in Sutton and 7 of 16 sites (44%) in Merton, although for some sites, exuviae were not found every year. It was not possible to determine the precise number of trees infested but by taking the year with the most trees infested for each site, then 104 (27%) and 16 (6%) were infested in Sutton and Merton respectively. Both of these figures are underestimates, particularly Sutton, since other trees will have been infested in other years. In Sutton, four sites had more than ten infested trees while in Merton, only Morden Hall Park, with seven infested trees, had more than two infested trees. In Merton, with the exception of the aforementioned site and Wandle Road, infested trees were only found in the Mitcham area. It should be noted, however, that Mitcham was the most intensively searched region of the borough. There were five sites which showed no evidence of either current or past infestation: Sutton Cemetery and St Dunstan's Hill in Sutton; Mitcham Common, Morden Park and Wimbledon Park in Merton. Although Mitcham Common showed no evidence of past infestation, it is close to some infested roadside sites including Commonside East, Aspen Gardens and Windmill/Croydon Road, which are effectively sub-sites of the Common.

Table 3 shows the distribution of the number of exuviae found per tree in Sutton. Most trees had fewer than four exuviae in a year but 'good' trees could have up to ten. One exceptional tree, which was riddled with holes, had the following counts of exuviae: 10 (1994), 26 (1995), 7 (1996), 9 (1997) and 29 (1998). Furthermore, access to this tree was difficult preventing a thorough search and removal of exuviae, so these numbers are undoubtedly minima. This tree, although badly in need of pollarding, was still healthy. The next most prolific tree had the following counts: 10 (1995), 17 (1996), 1 (1997) and 3 (1998).

Although no attempt was made to record the direction faced by protruding exuviae, it was clear that there was no preference with many exuviae facing to the north and others to the south. Also, exuviae were often found in trees surrounded by dense vegetation around the base of the tree and even in one tree whose base was covered on all sides by ivy. Table 4 shows trees classified according to their habitat. 'Open' indicates trees surrounded by gang-mown grassland and 'closed' surrounded with vegetation, with 'intermediate' having some vegetation. The table shows that there is a preference against open habitats, with the highest level of infestation occurring in the closed category. Many of the trees in open sites had old exit holes (holes that did not have exuviae and looked weathered).

In both Merton and Sutton, most exuviae were found close to the base of the tree and with two exceptions were within 60 cm of the ground. The first was the Sutton tree riddled with holes already referred to, where holes and exuviae reached up to 2 m. The other was the tree covered in dense ivy where the only two exuviae found were about 1 m from the ground. Others may easily have been missed amongst the ivy.

Exuviae were usually found in trees with a diameter greater than 1m; however, they were occasionally seen in trees with a diameter of 15cm when close to larger trees. Exuviae were also found in stumps which had been cut down more than five

Table 1. Sutton sites searched for the presence of hornet moth

Site and grid reference	No. of trees	No. of infested trees /No. of exuviae				
		1994	1995	1996	1997	1998
Parks Open spaces:						
Beddington Park TQ294655	16	1/6	2/4	0	0	0
Beddington Farmlands TQ290665	6	—	1/2	0	2/2	0
Belmont Park TQ256622	1	—	—	0	1/1	1/2
Culvers Island TQ279661	15	—	7/18	6/19	11/25	9/17
Dale Park TQ279659	15	(1/2)	8/21	6/32	1/1	8/15
Ecology Centre TQ278647	1	0	1/1	0	1/1	0
Grove Park TQ282648	8	—	—	1/1	0	1/1
Manor Gardens TQ287651	5	—	—	2/2	2/4	0
Mellows Park TQ299641	1	—	—	1/1	0	0
Mill Green TQ282670	3	3/6	3/5	1/1	0	1/1
Pyl Brook, Stonecot TQ244658	78	—	17/34	25/47	19/29	11/15
Rosehill Park TQ259662	83	(4/6)	12/18	9/15	14/37	8/11
Roundshaw Park TQ299631	14	1/1	0	0	0	1/2
Roundshaw Playing Fields TQ307635	13	—	—	1/1	2/2	6/8
Royston Park TQ268654	5	—	—	0	1/2	0
Seears Park TQ246642	4	—	0	0	0	0
Sutton Cemetery TQ249650	6	—	—	—	0	0
Stanley Park TQ279630	14	0	0	0	0	4/9
Wilderness Island TQ283656	1	1/6	1/5	1/2	0	1/1
Wrythe Recreation Ground TQ275651	1	—	—	0	0	0
Streets:						
Beddington Lane TQ293669	4	—	—	—	4/10	—
Belmont Rise TQ251623	2	—	0	0	0	0
London Road TQ283666	31	(3/12)	8/62	10/37	10/40	10/60
Pine Walk TQ266620	5	1/1	0	1/1	0	0
Richmond Road TQ305653	46	—	—	—	—	4/4
St Dunstan's Hill TQ245645	1	—	0	0	0	0
Schools:						
Barrow Hedges TQ273631	1	—	—	1/2	0	
Victor Seymour TQ278650	3		0			
Total number of trees	383	54	292	324	334	375
Total number of infested trees		7	61	65	68	65
% of trees infested		13	21	20	20	17
Total number of exuviae		20	170	161	154	146
Mean no. of exuviae per infested tree		2.86	2.62	2.48	2.26	2.28
Yearly comparisons of exuviae	1994–95	20	15			
	1995–96		170	154		
	1996–97			161	144	
	1997–98				144	142
	1995–98		170			131

For counts in parentheses, not every tree was checked and these sites have been excluded from the totals.

Table 2. Merton sites searched for the presence of hornet moth

Site and grid reference	No. of trees	No. of infested trees/ No. of exuviae			
		1995	1996	1997	1998
Parks Open Spaces:					
Sir Joseph Hood Rec. TQ226671	12	2/2	0	0	0
Mitcham Common* TQ286681	64	0	0	0	0
Morden Cemetery TQ231672	50	0	0	0	0
Morden Hall Park TQ262686	34	7/10	0	0	0
Morden Park TQ246673	13	0	0	0	0
Wimbledon Park TQ245725	65	0	-	0	0
Streets:					
Aspen Garden* TQ281675	7	—	0	2/11	1/5
Beddington Lane* TQ293672	11	0	0	0	0
Commonside East* TQ292681	1	1/4	1/8	1/3	1/2
Eastfield Estate* TQ288691	7	0	0	0	0
Wandle Road TQ269679	2	1/1	2/2	1/1	0
Windmill Croydon Road* TQ291676	24	—	-	1/1	1/4
Schools:					
Hatfield TQ240672	2	0	0	0	0
Lonesome* TQ285694	2	0	0	0	0
Rowan* TQ293691	2 (1 1997)	0	0	0	0
Sherwood* TQ294681	1	1/3	0	0	0
Total number of trees	297	266	208	296	296
Total number of infested trees		12	3	5	3
% of trees infested		4.5	1.4	1.7	1.0

*Mitcham site.

years ago but were still alive with plenty of suckers. They were also recorded in white poplars on two sites but never Lombardy poplars.

Discussion

There is the assumption that clearwings are under-recorded due to their diurnal habits. However, it is relatively easy to find evidence of many species of clearwing. There were old records of hornet moth in both boroughs but the existence of an arboricultural database (STEMS maintained by the local authority) greatly increased the comprehensiveness of this study. This study found at least 27% of poplar trees to be infested in Sutton and 6% in Merton with hornet moth. Plant (1997) reviewing this fieldwork considered 'this is surely the most clear evidence that this moth is grossly under-recorded in the London area'. We consider that this could be the case but perhaps equally likely is that Sutton is a hotspot. Without prejudging the issue, we tend towards the latter. Sutton is much more heavily infested than Merton and casual inspection of suitable trees in neighbouring boroughs did not reveal any exuviae. Nevertheless we accept that this issue will only be resolved with further fieldwork and we hope that this article may prove the impetus for more people to search their local poplar trees. The need for such work is reinforced by a recent note

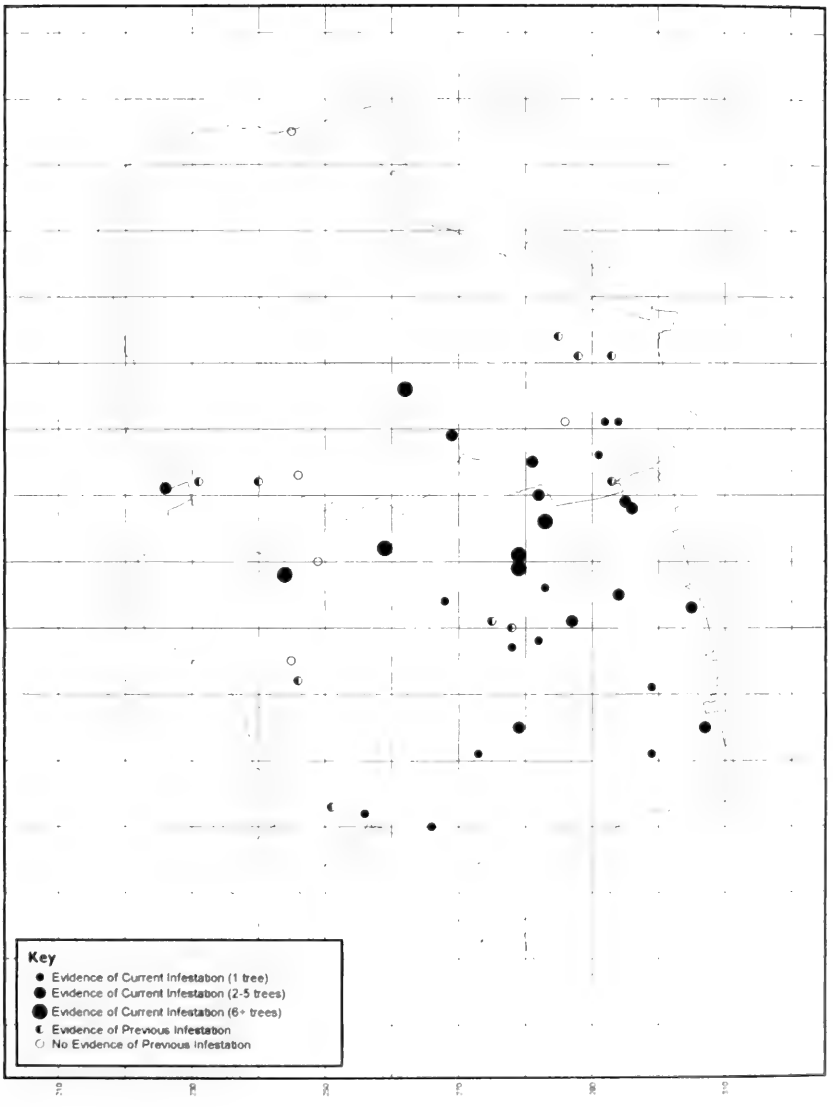

Fig. 1. Hornet moth: distribution and current status in LB Merton and Sutton.

in the arboricultural literature (Gibbs *et al.*, 1998) which suggested that this species of moth is causing 'extensive bark damage' to poplars in eastern England and may be responsible for crown dieback. We found neither evidence of bark damage nor crown dieback.

In our study area, despite the high prevalence, there is circumstantial evidence to indicate that the population is declining. Many moth populations fluctuate widely in

Table 3. Distribution of exuviae from Sutton sites between 1994 and 1998

No. of exuviae tree year	No. of trees
1	117
2	59
3	31
4	9
5	5
6	6
7	4
8	6
9	1
10	2
17	1
26	1
29	1

Excludes a few sites where the information was not recorded.

numbers from year to year making the detection of trends difficult. Hornet moth is no exception, the counts from Dale Park being particularly erratic. However, this moth very probably occurs at low density, so a decline would be of concern. We believe the following evidence points towards the population being in decline.

- Most sites have old exit holes indicating former infestation. In Sutton only two sites did not have old exit holes. At Richmond Road, where there are 46 trees, every tree had old holes but only four were infested in 1998. In Merton six of the nine non-infested sites had old exit holes. Morden Cemetery has numerous apparently suitable poplar trees, many with old holes; however no exuviae were seen, suggesting site extinction. Furthermore exuviae have not been found since 1995 at Sir Joseph Hood Recreation Ground, which is contiguous with the Cemetery.
- For several sites in both boroughs, exuviae occur in small numbers and have not been seen every year, although most of the trees had exit holes. Morden Hall Park shows a particularly worrying decline. Occasional inspection of the trees before

Table 4. Infestation of trees in Sutton according to habitat

	Open	Intermediate	Closed
No. of tree-years	453	217	384
No. of infested tree-years	29	41	114
% infested	6	19	30
No. of exuviae	49	70	303
Mean per infested tree	1.69	1.71	2.66

All fully checked sites from 1994 to 1998 have been included, except Pyl Brook and the two school sites. In addition, the two most heavily infested trees (one would have been classified as intermediate and the other closed) have been excluded to avoid them distorting the figures.

1995 always revealed exuviae and in the first year of this study a relatively high count was recorded, but none since.

- The yearly counts of exuviae show some evidence for a decline. It is considered that our searching efficiency has remained relatively constant over the study period and so totals from sites counted in consecutive years do provide a measure of how the population is faring. Between 1995 and 1998 in Sutton, there were declines of 13% for the mean number of exuviae per infested tree and 24% for the total number of exuviae.

Prior to this study it was considered that the moth preferred trees devoid of surrounding basal vegetation (Waring, in press); our data suggests otherwise. We consider that there are two possible explanations for this.

Adult females can lay up to 1400 eggs (Heath & Emmet, 1985). The number of exuviae found is undoubtedly lower than the number of moths emerging; many exuviae are likely to be missed when searching amongst dense vegetation or may be blown away by strong winds. Nevertheless, even allowing for this it would appear that there is heavy mortality between egg and adult. Whilst it is impossible to determine the key mortality factor from our study, we consider that predation of both the pupa and emerging moth may be significant. Exuviae were sometimes found at a short distance from the tree, which could indicate predation by, for example, great spotted woodpecker, although none were seen during early morning searching. Accordingly egg-laying females may select trees surrounded by vegetation to reduce this threat.

Alternatively, it may simply be determined by tree suitability. It is possible that there is a limit to the number of larvae a tree can provide food for, after which it is no longer chosen by females. If this is the case, then it would be expected to find a large number of trees with old exit holes and young trees would be infested as soon as they became suitable. At Stanley Park, which has three large trees with old exit holes and several young trees, no exuviae were found until 1998 when nine were found in four of the young trees. It is feasible that trees surrounded with vegetation are only selected after 'open' trees are no longer suitable. The other interesting aspect is why larvae do not seem to feed higher up in the tree. In only two trees were exuviae found above 60 cm.

Thus the observation that trees surrounded by vegetation are preferred can be explained by either heavy predation pressure or selection of sub-optimal trees. Nevertheless, both of the explanations suggest that the population may be unsustainable either as a result of heavy predation or through the lack of suitable trees. With this in mind, management to arrest decline should be implemented. We consider that there is an urgent need for more black poplars to be planted, especially in Sutton. Furthermore, the current stock of trees in both boroughs should be maintained by pollarding on a regular cycle and felling should only take place where public safety is an issue, and in such circumstances a 'stump' of 1–2 metres left *in situ*. The recent changes in the maintenance of municipal parks and the trend towards leaving vegetation around the base of trees uncut clearly has management implications for the moth; however, advice on the most appropriate management of basal vegetation requires further work.

Acknowledgements

We would like to thank Dave Lofthouse and Daniel Kemp, the Arboricultural Officers for Merton and Sutton, for providing extracts from their STEMS databases.

Alistair Kirk of the London Wildlife Trust for producing Figure 1 and Marie-Claire Edwards, Amanda Morgan, Simon Ramsdale and Neil Vigar for help in searching for exuviae.

References

Collins, G.A. 1997. *Larger moths of Surrey*. Surrey Wildlife Trust,Woking, Surrey.

Gibbs, J.N., MacAskill, G.A., Lonsdale, D., & Tilbury, C.A. 1998. The Health of Non-Woodland Trees in England 1998. *Arboriculture Research and Information Note 147/path 98*. Arboricultural Advisory and Information Service, Farnham, Surrey.

Heath J. & Emmet A. 1985. *The moths and butterflies of Great Britain and Ireland*. Volume 2. Harley Books, Colchester, Essex.

Plant, C.W. 1993. *Larger moths of the London Area*. London Natural History Society, London.

Plant, C.W. 1997. A review of the butterflies and moths (Lepidoptera) of the London Area for 1995 and 1996. *London Naturalist* **76**:157–174.

Waring, P. (in press). *A provisional atlas of the scarce and threatened Macro-Moths of Great Britain*. JNCC, Peterborough.

SHORT COMMUNICATION

***Peritrechus gracilicornis* Puton (Heteroptera: Lygaeidae) in West Cornwall** In September 1993 I took *P. gracilicornis* at two localities in West Cornwall. At Glendurgan Gardens, West Cornwall (SW772277), on 16 September, the combination of a shower of rain and a sleeping child brought about a brief postponement of a planned tour of the gardens, and I whiled away the time by investigating a large compost heap in partial tree shade beside the car park. Ten minutes of tapping the overhanging thatch of the heap over a tray was rewarded by a large number of *Peritrechus*, some of which had markedly pale hind tibiae. A sample of twenty pale-legged individuals removed for closer examination proved to consist of five *P. gracilicornis* and fifteen *P. geniculatus* (Hahn). This collecting method also produced additional species of Heteroptera: *Anaptus major* (A. Costa), *Anthocoris nemorum* (L.), *Aptus mirmicoides* (O. Costa), *Drymus ryei* Douglas & Scott, *Drymus sylvaticus* (Fab.), *Plinthisus brevipennis* (Latreille), *Scolopostethus affinis* (Schilling), *Scolopostethus thomsoni* Reuter, *Stygnocoris fuligineus* (Geoffroy), *Stygnocoris sabulosus* (Schilling) and *Xylocoris galactinus* (Fieber), as well as the weevils *Orthochaetes insignis* (Aubé) and *O. setiger* (Beck). A considerably longer list could no doubt have been obtained by more prolonged investigation.

It is not clear whether the *P. gracilicornis* were in the compost heap voluntarily. A considerable amount of material had been recently added to the pile and many insects may have been incorporated with it. Certainly some of the other species recorded would not usually be expected from a compost heap. On the other hand, *Peritrechus* seem attracted to heaps of cut vegetation, at least for overwintering purposes. I have, for example, beaten very large numbers of *P. geniculatus* and *P. nubilus* (Fallén) from piles of cut sedge at Chippenham Fen NNR, Cambridgeshire (TL646694) on 5.x.1992, and *P. geniculatus* from stacked straw at the margin of an arable field near Oldfield Pond, Northamptonshire (TF132002) on 19.iv.1993. Whether their presence in the compost heap was voluntary or not, the *P. gracilicornis* of Glendurgan Gardens must have a more natural habitat for at least part of the year, but where this might be, in or near the extensive and varied gardens, must remain uncertain.

The second location for *P. gracilicornis* is probably more typical of the species. A single individual was taken by beating a large clump of sea plantain, *Plantago maritima* L., growing low on the sea cliff at Porthallow, SW797233, on 23 September. Other Heteroptera found by beating vegetation clumps on this cliff were *Acalypta parvula* (Fallén), *Anaptus major*, *Anthocoris nemorum*, *Aptus mirmicoides*, *Beosus maritimus* (Scopoli), *Coreus marginatus* (L.), *Enoplops scapha* (Fab.), *Lygus maritimus* Wagner, *Nabis ferus* (L.), *Peritrechus nubilus*, *Plinthisus brevipennis*, *Scoloposthethus affinis*, *Stygnocoris fuligineus*, *S. sabulosus*, *Taphropeltus contractus* (H.-S.) and *Trapezonotus ullrichi* (Fieber).

P. gracilicornis is a rare species in Britain, and records are largely restricted to the south coast. Previous records come from Kent, Sussex, Surrey, Hampshire and Dorset. Though Allen (1980) found it in numbers at Studland Bay, Dorset, most records are of at most a few individuals, and there has been some doubt as to whether the species is established as a long-term resident or merely forms transitory populations following immigration (Kirby, 1992). The uncertainty is compounded by the fact that it is superficially similar to other *Peritrechus* species, giving considerable scope for *gracilicornis* being either overlooked or misidentified. At both of the West Cornwall localities, *P. gracilicornis* occurred with other *Peritrechus* of one of these similar species, and in both cases *gracilicornis* was considerably in the minority. Careful examination of *Peritrechus* in the field, and the removal of specimens covering the full range of variation seen for closer examination, is clearly advisable.—P. KIRBY, 21 Grafton Avenue, Netherton, Peterborough, PE3 9PD, UK.

REFERENCES

Allen, A. A. 1980. *Peritrechus gracilicornis* Puton (Hem., Lygaeidae) well established in the Studland area, Dorset. *Ent. Mon. Mag.* **116**: 65–66.

Kirby, P. 1992. A review of the scarce and threatened Hemiptera of Great Britain. Joint Nature Conservation Committee, Peterborough (UK Nature Conservation, no. 2).

BOOK NOTICE

Log Book of British Lepidoptera. J. D. Bradley, 2000. iv + 108 pp. 120 × 190 mm, plasticised cover. Published privately. ISBN 0 9532508 1 4. Available from David Bradley, The Glen, Frogham, Fordingbridge, Hants SP6 2HS. Price £6 + £1 p&p. This pocket-size fully updated log book covers the 2500 and more species and forms of Lepidoptera at present known from the British Isles, using the current scientific names, and indicates the *national status* of the protected and less common species. It has the numbering system for species as in the original recorder's log book (Bradley & Fletcher 1979) and in the *Checklist of Lepidoptera recorded from the British Isles* (Bradley 1999) [a revised edition of which is imminent], and can be accessed through the indices in the checklist.

OFFICERS' REPORTS FOR 1999

COUNCIL REPORT 1999

After several years of growth the number of members has been almost static this year. At the end of the year the Society's membership stood at 847, an increase of 3 on the previous year. 40 new members joined the Society and 1 was reinstated, but 15 resigned and 17 were struck-off for non-payment of subscriptions. 6 deaths were reported to the Society during the year. Dr N. Birkett completed 50 years continuous membership of the Society at the end of the year and was elected a Special Life member.

A large increase in room rental caused the Council to decide to move its meetings a few hundred yards down Queen's Gate to the rooms of our sister organisation, the Royal Entomological Society. The Council regretted leaving Baden-Powell House whose staff had always been courteous and helpful. The Council met seven times during the year and, on average, 14 members attended each meeting.

The Council decided that from 2000 the date of the Annual Meeting would be moved to the second Tuesday in March to allow more time for the preparation of the Society's accounts. This later date is allowed for by the Society's Bye-laws.

The Council spent some time considering the consequences of the terms under which Forest Enterprises is now issuing permits for field meetings. One clause in the permit seeks to limit Forest Enterprises' liability for its own negligence and to pass this liability to the organisation or leader holding the meeting. This would place financial responsibility for any death or injury, as a result of Forest Enterprises' negligence, onto the Society and its Trustees. This is unacceptable and, in our insurer's opinion, is an uninsurable risk. The Council has therefore decided that, until this matter is resolved, no further field meetings will be held on Forest Enterprises' land. The Council is grateful to Dr M.J. Smart for drawing attention to this problem.

John Phillips has succeeded Stephen Miles as one of the Society's two representatives on the Joint Committee for the Conservation of British Invertebrates (JCCBI); the other representative is Raymond Uffen. Our representatives have attended the JCCBI meetings where, among other subjects, the formation of an invertebrate conservation society has been discussed.

The Biodiversity Action Plan Heathland Fly project has completed its first season with all objectives being met. We hope that this project will develop to show how the Society can deploy its members' strengths in field biology and make a significant scientific contribution to species conservation. For a similar reason the Society has responded positively to a request from Butterfly Conservation for assistance with their Action for Threatened Moth Species project. The Society has identified ways in which members can assist with this project through species monitoring and autecological studies. These are being promoted to members, whose contribution will be co-ordinated by the Conservation Working Group.

Ten indoor meetings were held at the rooms of the Royal Entomological Society and a joint meeting with the London Natural History Society was held in the rooms of the Linnean Society. 8 workshop meetings were held in the Pelham-Clinton Building, which was also opened on 17 occasions for members to consult the collections and library. The fall in attendance at indoor meetings seems to have been checked with a slight increase to 20 in the average attendance. The workshop meetings continue to prove popular with a good attendance, and the rooms were well used by members on each occasion the library and collections were opened. The Council greatly appreciates the contribution of this year's speakers and workshop leaders who all share their expertise free of charge. Once more the Council's thanks

are due to Dr McLean for organising the programme of meetings and to Mr Chandler for being present to open and supervise the Pelham-Clinton Building on nearly every occasion it is used by members.

A new temperature and humidity regime for the Pelham-Clinton Building was decided. The controls are now set to give a relative humidity of 50% with a maximum of 55% and minimum of 40%, and a temperature of 19 C with a maximum of 22 C and a minimum of 16 C. So far this has operated satisfactorily and the high humidity peaks have not re-occurred. The electricity consumption remains reduced but a true picture will not be available until after the winter. Work on the air conditioning was delayed for a period when the loft ladder collapsed leaving your Hon. Secretary suspended in mid-air. No injury was suffered, other than to the Secretary's dignity, and the ladder has now been replaced by a more substantial model.

There were thirty field meetings during the year of which seventeen were joint meetings with other societies. The meetings covered a wide range of localities and habitats in Scotland, Wales and England, and much useful data were collected. The Society is indebted to Dr Paul Waring's enthusiasm in organising this large and varied programme of meetings.

The Annual Exhibition and Dinner were again held at Imperial College in South Kensington but, as anticipated last year, the date of both events (27 November) was a month later than usual. 191 members and 49 visitors signed the attendance book for the exhibition. This was a decrease on the numbers attending compared with 1998 but the same number as in 1997. It is hard to judge whether the change in date had any effect on attendance. A provisional booking has been made for 11 November in 2000. The venue for the exhibition continues to attract criticism from a small number of members due to the cost and availability of parking. Those attending the Exhibition this year were asked to complete a questionaire on the choice of venue. The majority of those completing the questionaire were satisfied with the present arrangements. The full results from the questionaire will be published in the *Journal*. 49 members and their guests sat down for the Annual Dinner, which is a slight increase on last year. Mr Simmons continues to organise both the Dinner and Exhibition and the Council is very grateful to him for doing this.

Sales of the Society's publications exceeded £7000 and this is in no small part due to their promotion by Mr Gavin Boyd. However, the stock of our major revenue earner, the Hoverfly book, is nearly exhausted and so unless this is reprinted, or promised new publications appear, a reduction in income might be anticipated next year. The Society has a number of new publications planned with three under way and two others under consideration. A lot of effort is put into these publications by their authors and the Publications Committee, but by their nature they take a long time to come to fruition. It is disappointing to report that the long-awaited book on British Soldierflies and their Allies has not been published this year but it is encouraging that it is now with the typesetter. During the year the Council decided to reduce the stock of back numbers of the Society's periodicals. The outcome of this decision is detailed in the Librarian's report.

During the year the Society made a contribution of £250 to the RSPB towards the purchase of Dingle Marshes and agreed a grant of £500 to Dr M.E. Archer to assist with the production of a handbook on British Potter and Mason Wasps. A grant to Mr R.F. McCormick towards the production of a new Devon Moth List was approved in principle with the amount yet to be decided.

JOHN MUGGLETON

TREASURER'S REPORT

The statement of financial activities for 1999 discloses that expenditure exceeded income by £4,717 against a net income in 1998 of £836. Overall our income has fallen by about £1,000 and we have spent £4,500 more than last year. Of this increased expenditure nearly £3,000 has been for direct charitable purposes. The accounting convention by which we capitalise certain expenditure and write it off over a period of years masks the true extent of our expenditure this year, because the net amount after depreciation which has been capitalised in respect of new cabinets and the binding of books is nearly £7,000. All of this capital expenditure is in respect of our core charitable aims.

It is disappointing that the cost of managing the society has risen this year. The largest cost included here is insurance, a cost that I monitor closely, but which inevitably increases as life becomes more litigious.

It has been a mixed year for investment performance and that continues to be the case. Our policy of a wide range of different investments, some directly on the stock exchange, some in bonds and some in cash deposits seems to have paid off. Investment income was up 16% at £15,110 and market value at the balance sheet date of £247,882 was also up albeit only by 4%.

Turning to the balance sheet; the Housing Fund has grown to £231,000 of which investments represent £92,000; the Special Publications Fund stands at nearly £69,000 and the Research and Hering Funds have grown to £36,600 and just under £17,000 respectively. I believe our Society is in good heart financially and well able to continue to support the expanding programme of activities envisaged by Council.

I usually like to thank those who have made my job as treasurer easier but first and exceptionally this year I would like to single out our bankers, NatWest at Epsom for reaching new heights of incompetence and unhelpfulness. Well done! I have received a great deal of help from our insurance broker, John Ehrhardt for which I am most grateful. This year our long standing auditor, Reg Bell was not available to assist us and at the last moment Alec Harmer kindly stood in and helped Dennis O'Keeffe carry out the independent examination. I thank all these gentlemen on behalf of the Society.

A. J. PICKLES

Independent Examiners' Report

We report on the accounts of the Society for the year ended 31 December 1999, which are set out on pages 111 to 115.

Respective Responsibilities of Trustees and Examiners

As the Charity Trustees you are responsible for the preparation of the accounts, you consider that the audit requirement of Section 43 (2) of the Charities Act 1993 does not apply. It is our responsibility to state, on the basis of procedures specified in the General Directions given by the Charity Commissioners under Section 43 (7) (b) of the Act, whether particular matters have come to our attention.

Basis of Independent Examiners' Report

Our examination was carried out in accordance with the General Directions given by the Charity Commissioners. An examination includes a review of the accounting

records kept by the Charity and a comparison of the accounts presented with those records. It also includes consideration of any unusual items or disclosures in the accounts, and seeking explanations from you as Trustees concerning any such matters. The procedures undertaken do not provide all the evidence that would be required in an audit, and consequently we do not express an audit opinion on the view given by the accounts.

Independent Examiners' Statement

In connection with our examination, no matter has come to our attention:

1. which gives us reasonable cause to believe that in any material aspects the requirements
   a. to keep accounting records in accordance with Section 41 of the, Act; and
   b. to prepare accounts which accord with the accounting records and to comply with the accounting requirements of the Act have not been met; or
2. to which, in our opinion, attention should be drawn in order to enable a proper understanding of the accounts to be reached.

D. O'KEEFFE and A. S. HARMER

Statement of Financial Activities
for the year ended 31 December 1999

		Unrestricted Funds	Restricted Funds	Endowment Funds	Total Funds 31.12.99	Total Funds 31.12.98
Incoming Resources						
Subscriptions		10250	—	—	10250	12128
Investment Income		5288	8764	1058	15110	13007
Trading Income	note 2	2869	3626	—	6495	5251
Sundry Income	note 3	5323	—	—	5323	7621
Total Incoming Resources		23730	12390	1058	37178	38007
Resources Expended						
Direct Charitable Expenditure:						
Cost of Journal & Distribution		12608			12608	10490
Cost of facility at Dinton Pastures			2368		2368	3681
Members Meetings & Exhibitions		3914			3914	3527
Library & Curation		634			634	3963
Grants	note 10	1715		840	2555	3603
Sundry Income costs	note 3	5200			5200	
Depreciation		5187	2210		7397	6588
		29258	4578	840	34676	31852
Other Expenditure						
Management costs		4745			4745	3108
Trading costs	note 2		2474		2474	2211
		4745	2474		7219	5319

Total Resources Expended	34003	7052	840	41895	37171
Net Resources before transfers	(10273)	5338	218	(4717)	836
Net Incoming Outgoing Resources	(10273)	5338	218	(4717)	836
Gains & Losses on Investment assets Unrealised	3799	6295	760	10854	17758
Net movement in Funds	(6474)	11633	978	6137	18594
Fund Balances brought forward at 1st January 1999	159406	288817	15940	464163	445569
Fund Balances carried forward at 31st December 1999	152932	300450	16918	470300	464163

Summary Income and Expenditure Account

	1999	1998
Gross Income of continuing operations	37178	38007
Total expenditure of continuing operations	41895	37171
Net Income Outgoings for the year	(4717)	836

Balance Sheet
as at 31st December 1999

	Notes	1999	1999	1998	1998
Fixed Assets					
Tangible Assets	4		185616		180833
Investments	5		247882		237028
			433498		417911
Current Assets					
Stocks		7319		9197	
Debtors	6	8310		7747	
Cash at Bank and in hand	7	23868		35328	
		39497		52272	
Creditors: amounts falling due within one year	8	2695		6020	
Net current assets			36802		46252
Net assets			470300		464163

Funds	9			
Endowment Funds—Hering Fund		16918		15940
Restricted Funds—Housing Fund	231689		226920	
Special Publications Fund	68761	300450	61897	288817
Unrestricted Funds:				
Research Fund	36611		34181	
General Fund	116321	152932	125225	159406
		470300		464163

The accounts were approved by the Council of Trustees on 2 March 2000 and signed on its behalf.

Notes to the accounts
for the year ended 31 December 1999

1. Accounting Policies

The Accounts of the Charity are prepared in accordance with the Charities (Accounts and Reports) Regulations 1995, the statement of recommended practice, Accounting by Charities, and with applicable accounting standards. They are drawn up on the historical accounting basis except that investments held as fixed assets are carried at market value.

1.1 Income

Donations and legacies are accounted for as soon as their amount and receipt are certain. In the case of donations this is usually when they are received. All other income is accounted for under the accruals concept. Gifts in kind are valued at their estimated value to the Charity.

1.2 Expenditure

Expenditure is accounted for under the accruals concept. The irrecoverable element of VAT is included with the item of expense to which it relates. Depreciation is allocated over the expenditure headings on the basis of the use of the assets concerned.

1.3 Fixed Assets

Tangible fixed assets are stated at cost or trustees valuation less depreciation which is calculated at rates to write off the excess of cost over estimated residual values of individual assets over their estimated useful lives as follows

Leasehold Buildings at Dinton Pastures	1/70th of cost
Fixtures and Equipment	10% of written down value

1.4 Investments

Fixed asset investments are stated in the balance sheet at mid market value at the balance sheet date.

1.5 Stock

Stock is valued at the lower of cost, including irrecoverable VAT, and market value and consists of publications and sundries held for resale.

1.6 Restricted Funds

Restricted funds are subject to specific conditions laid down by the donors as to how they may be used.

2. Trading Income and Expenditure

Trading income is derived from the sale of the *British Journal of Entomology* to non-members of the Society and from sale of the Society's other publications and products, costs are those of printing and distributing these items.

3. Sundry Income

Sundry income has been derived from the sale of surplus insect cabinets and specimens and income from the annual dinner. Costs associated with this represent assumed value of cabinets sold.

4. Tangible fixed assets

	Leasehold Property	Fixtures & Equipment	Total
Cost	£	£	£
At 1 January 1999	154736	53013	207749
Additions	—	17330	17330
Disposals	—	(5200)	(5200)
At 31 December 1999	154736	65143	219879
Depreciation			
At 1 January 1999	13260	13606	26866
Charge for year	2210	5187	7397
On disposals	—	—	—
At 31 December 1999	15470	18793	34263
Net book values			
At 31 December 1999	139266	46350	185616
At 31 December 1998	141476	39407	180883

Leasehold premises represents the cost of building and equipping the headquarters at Dinton Pastures Country Park. The total cost of these premises which were completed during the year to 31 December 1993 are being amortised over the seventy year term of the lease. Fixtures and equipment includes a value for the library and collections as well as computers, microscopes and other ancillary equipment. Additions consist of amounts spent on new insect cabinets and library acquisitions and binding. Disposals represents the sale of surplus cabinets.

5. Investments

In accordance with accounting requirements investments are shown in the balance sheet at market value.

	1999		1998	
	M.V.	Cost	M.V.	Cost
Shell T & T	6328	1250	4207	1250
Unilever	12198	248	4481	248
M & G Charifund	66547	20238	67003	20238
Treasury 1999 9¼ %	2640	2392	2640	2392
Treasury 8¾ %	3688	3688	3688	3688
Hendersons Bond	64276	58000	64951	58000
Sun Life Bond	67223	56000	65142	56000
Barings Bond	24982	25000	24916	25000
	247882	166816	237028	166816

6. Debtors	1999	1998
Due within one year		
Trade debtors	754	473
Recoverable Taxation	4528	4474
Prepayments and accrued income	3028	2800
	8310	7747

7. Cash at Bank and in Hand		
National Westminster Bank		
Capital Reserve	5977	5703
Current Account	1327	6004
Eurocheque Account	148	582
	23868	35328

8. Creditors: amounts falling due within one year		
Trade Creditors	2695	1400
Accruals	—	4620
	2695	6020

9. Funds

Analysis of net assets between funds

	Tangible Fixed Assets	Investments	Net Current Assets	Total
Endowment Fund:				
Hering Fund	—	16918	—	16918
Restricted Funds:				
Housing Fund	139266	92423	—	231689
Special Publications	—	61557	7204	68761
Unrestricted Funds:				
Research Fund	—	36611	—	36611
General Fund	46350	40373	29598	116321
	185616	247882	36802	470300

The Hering Fund was endowed to make grants out of income for research in specific areas of entomology.

The Housing Fund consists of the property at Dinton Pastures and money put aside to finance its upkeep and eventual replacement. The funds were derived principally from bequests from the late Duke of Newcastle, Mr Crow and Mr Hammond.

The special Publications Fund finances the Society's publications other than the *British Journal of Entomology* and surpluses from such publications are credited to this fund to finance future publications.

The Research Fund was set up in 1996 with funds derived from part of the old Bequest Fund which was closed with the intention of financing future grants to entomological research which would be authorised by Council but not so narrowly defined as those made by the Hering Fund. In 1999 the first grants were made from this Fund.

10. Grants

In addition to grants of £840 paid from the Hering Fund and £1465 from the Research Fund the Society has granted £250 towards the cost of the purchase by the Royal Society for the Protection of Birds of a reserve at Dingle Marshes.

A. J. PICKLES

BENHS RESEARCH FUND REPORT FOR 1999

The sum available for grants was £2000, and six applications were received. Five awards, totaling £1465, were made as follows:

1. Mr M.C. Harvey (Hampshire Wildlife Trust), £150, to assist with a search for the larvae of the moths *Trichopteryx polycommata*, *Scotopteryx bipunctata*, *Eilema sororcula*, *Agrotis cinerea* and *Heliothis viriplaca* on Broughton Down reserve in Hampshire and to provide descriptions of their habitats.
2. Mr J. Kramer, £360, to support a project to find which species of cranefly (Diptera: Tipulidae) are present on Bardsey Island and to relate the species found to the biotypes on the island. Special attention will be paid to the cranefly fauna of mossy flushes and springs.
3. Mrs G. Orledge, £323, to fund visits to museum collections in London, Oxford, Cardiff, Edinburgh and Manchester in connection with a Ph.D. project on the identification and distribution of the British Ciidae (Coleoptera) The project aims to produce a new identification key for British ciids and provisional distribution maps.
4. Dr A.J.A. Stewart, £300, to provide a second year's support for work on the collection, collation and computerisation of data on the distribution of the Auchenorrhyncha.
5. Mr R. Williams, £332, to provide support for the production of a book on the identification of the causers, inquilines and parasitoids of British oak-galls by enabling visits to be made to examine specimens in museums in Cardiff, Oxford and Manchester

In considering Dr Stewart's application the Research Fund panel felt that the circumstances warranted the award of a second grant. However, repeat awards are only made in exceptional circumstances and after other applications have been considered. More than two awards for any one project will not be considered.

Three of those awarded grants in 1997 have submitted reports. Mr R.F. McCormick has reported that his grant allowed the Devon Moth Group to visit eleven sites in 1998 to check for the continued existence of a number of scarce moth species. In addition the grant paid for the production of eight newsletters, and annual reports for 1998 and 1999. Copies of the Annual Reports have been deposited in the Society's library. Mr J.E. Milner has produced a report of his invertebrate sampling on relic natural vegetation sites on Shetland in 1998 and, in particular, of ungrazed holms on 8 lochs. The sampling confirmed that the holms do have a different invertebrate fauna compared with the surrounding areas and may provide a haven for relic species. A total of 43 species of spider and 26 species of beetle were collected from the holms and included five species of spider new to Shetland together with some nationally rare and scarce beetles. Sampling elsewhere on Shetland produced another four spiders new to the islands. Dr M.E. Archer was able to make four visits to each of three Northumbrian sand dune systems in 1998 and 1999 to survey them for aculeate wasps and bees. A total of 41 species were found and included 28 solitary

and 13 social species. Preliminary indications are that the Northumbrian dunes have fewer species than the Cumbrian dunes and no species of national significance.

The Council invites applications for future awards which should be sent to the Society's Hon. Secretary before 30 September in any year.

JOHN MUGGLETON

PROFESSOR HERING MEMORIAL RESEARCH FUND

The Committee agreed to make two awards from the Fund this year. Mr Martin Corley, of Faringdon, Oxfordshire, was awarded the sum of £340 to support a visit to the Muséum National d'Histoire Naturelle, Paris, to examine specimens of Portuguese Microlepidoptera. This work forms part of a revision of the species list of Portuguese Microlepidoptera, which requires many changes to its current form. Close study of several older collections is required to revise the list.

The sum of £300 was awarded to Professor Rimantes Puplesis, Vilnius Pedagogical University, to support his visit to Ecuador to collect leaf miners, particularly Nepticulidae and Opostegidae. These two very closely related families, which are united in the superfamily Nepticuloidea, have generally been considered largely temperate in their distribution. It is now being shown, notably by Professor Puplesis' work, that the tropical element of the families is likely to be significantly larger than was previously thought.

A report has been received from Professor Puplesis, who returned from his Ecuador expedition on 11 February 2000. Collecting was undertaken at the Yasuni Research Station and at the Jatun Sacha Biological Station. Both sites are in the Amazon basin. Some other collecting was carried out on the tropical western slopes of the Andes (for example, at Papallacta and Cotapaxi). The sampling has yielded about 18 new species of Nepticulidae and some very interesting material of other families of Microlepidoptera. No species of Nepticulidae had been collected from Amazon rainforest prior to this visit. The results of this visit are contributing to current revisionary work on Neotropical Nepticulidae in collaboration with Dr Gaden Robinson of the Natural History Museum, London. While we have quite a good broad knowledge of the Nepticulidae globally, conspicuously little is known about the family from the Neotropical region. So the Fund is very pleased to be able to support this work.

Dr Elisenda Olivella, from Heidelberg, who received an award from the Fund last year, has submitted a report on her work. The grant enabled her to visit the Natural History Museum, London, to identify a range of species mostly belonging to the leaf-mining lepidopteran genus *Phyllonorycter* that she had collected over the past three years from orchards in Spain, Portugal, Germany, Northern Italy, Japan and North America. While the identities of certain specimens remain unresolved, comparison with type material in London enabled Dr Olivella to identify most of her material. She was able also to gain a broad view of the distribution of many Palaearctic species. The results are currently being written up for publication.

The Hering Fund Microscope was transferred from Mr David Morgan to Mr Peter Skidmore (Swansea). During the past year, Mr Skidmore has completed at least 500 line illustrations for the book on bees being written by Mr George Else. A further 50–100 drawings are still required. Mr Else considers that the entire work will be completed later this year. The Fund is glad to have been able to support this very long running project by lending the microscope, but hopes that the work will indeed be completed in the near future.

MALCOLM SCOBLE

LIBRARIAN'S REPORT

This year I have made a concerted effort to address issues surrounding the libraries' journals, both the binding of titles we receive and the excessive quantity of unsold back-numbers of our house journal we hold. The backlog of journal separates requiring binding has been significantly reduced, our binders having completed three large tranches this year. In addition, they are currently working on a fourth batch dispatched recently. Titles that have been dealt with this year include:

Proceedings of the Royal Entomological Society; *Transactions of the Royal Entomological Society, General Entomology (A)*; *Transactions of the Royal Entomological Society, Taxonomy (B)*; *Transactions of the Royal Entomological Society, Journal of meetings (C)*; *Alexanor*; *Entomological News*; *Cecidology*; *Irish Naturalists Journal*; *Journal of the British Dragonfly Society*; *Journal of the Lepidopterists Society*; *Opuscula Entomologica*; *Tijschrift voor Entomologie*; *Annalen des Naturhistorishen Museums in Wein*; *Annales de la Société Entomologique de France*; *Anali del Museo Civico di Storia Naturale Genova*; *Atropos*; *Beitrage zur Entomologie*; *Beitrage zur Naturkundlichen Forschung in Sudwestdeutschland*; *Bollettino dell Instituto di Entomologia Bologna*; *Bollettino del Laboratorio di Entomologica Agraria Portici*; *Bulletin et Annales de la Société Entomologique de Belgique*; *Bulletin et Annales de la Société Royale Entomologique de Belgique*; *Bulletin de la Société Entomologique de France*; *Institut Royal des Sciences Naturalles de Belgique Bulletin*.

I am pleased to report that the high standard of work achieved in the past has been maintained and, if anything, improved upon. However, this is by no-means the end of this project as there remain many titles still to be processed. I am beginning to think that this task is similar to painting the Forth Bridge. Once the current backlog has been bound newly received items will have accumulated such that another round of binding will be required. In time I hope to reach a point where this aspect of librarianship becomes insignificant, but this is certainly not the position at present.

The second issue, that of the ever increasing quantities of unsold back-numbers of our house journal (some dating back to almost the turn of the century) was starting to cause concern on account of the large amount of shelf space they were occupying. With the advent of a new millennium I thought it timely to address this issue. Consequently I raised it with Council who agreed to a reduction of these items. This process was initiated about two months before our Annual Exhibition. Back numbers of the *British Journal* and of the *Transactions (Brit. Ent. Soc.)* were reduced to a maximum of 30 per part. Subsequently, the back-numbers of the *Transactions (South London)* were reduced to a maximum of 20 per part. I wish to thank Gavin Boyd, to whom I owe a great debt of thanks, for his assistance with this dusty task. Gavin's records of sales indicate that these levels will last for approximately 30 or 40 years! Some of you no doubt took advantage of the resulting excess stock at our exhibition where bundles of back-numbers were offered for sale at "very reasonable prices". This sort-out had the effect of freeing one entire rack of shelving and will enable me to make available some of the many books that are currently stored in the wooden book-cases and unavailable for loan at present. However, one down side of this was that we had a number of large cardboard boxes full of journal back numbers stored on the library floor. Gavin has arranged for these items to be stored with Tony Davis. I wish to extend my thanks to them for this as I would not have liked to dispose of these items, but I can assure members that this will be a last resort.

I wish now to turn to bugs, but of the millennium sort. I am pleased to report that the computer we use for Library and other Society business is no-longer suffering from an outbreak of this particular odious beast. My thanks for this go to Peter Verdon who has advised us on computer issues in the past. In January he installed various "patches" to ensure that dates etc. are displayed as four character fields rather than two. Hence, files now show 2000 as the date of creation or modification, rather than the symbol :0 that was shown before. After a while such notation would have become unusable. Mr Verdon also performed a full system backup using a zip drive and disk. In the past backups solely of the library database required five or six floppy disks to hold the data in compressed form. Using the zip drive all the items held on the computer, including systems programmes, "Recorder" and all the library material were crammed onto less than half a zip disk. I was so impressed that I purchased a zip drive for use during future backup procedures.

In the early part of last year the Society was presented with a large gift of books and bound journals from the estate of Sam Carter, who many of you knew. We owe Sam's family a huge debt of thanks for this generous gift and I would like to take this opportunity to express my thanks to them. Now that I have some spare shelf space I will be making these items available for loan as time permits.

This year I have dealt with several correspondents on various issues. One of these involved an unusual request from Mr A. Rudge who wished to obtain the set of Fowler's *Beetles of the British Islands* bequeathed to us by Thomas Eagles, a past president of our Society. Mr Rudge knew Mr Eagles and frequently worked with him in the field. After a prolonged correspondence Council decided to allow Mr Rudge to exchange a comparable set of this work for that bequeathed to the Society. Eventually Mr Rudge was able to satisfy this condition and, to his great pleasure, was presented with Mr Eagles' set of Fowler at The Pelham-Clinton Building in October.

Once again, John Muggleton's help with receipt and recording of journals has been greatly appreciated. Finally, I wish to thank Ted Wiltshire, John Muggleton, Peter Barnard, Roy McCormick, John Bradley, Ian Hepworth, Keith Alexander, Graham Collins, Mr Longton and Mr Askins for their generous donations to the library of books and journals over this period.

IAN SIMS

CURATOR'S REPORT

This year's report is a little longer as there has been progress in several areas and several acquisitions during the year.

As indicated last year the purchase of new cabinets, to assist in completion of the layout of the Hymenoptera and the reorganisation of the Diptera according to the recent check list, was a priority. Consideration was given to the most appropriate design of cabinets to obtain and the possibility of adopting the system of metal cupboards housing wooden drawers, as now in use at the Natural History Museum and some other major museums, was investigated and I am grateful to Mike Wilson and Howard Mendel for advising on this system. The alternative was to obtain further units entirely of wooden construction, similar to those purchased a few years ago.

Following consultation with the suppliers of the components of the dual system it was, however, decided to obtain the wooden units as first envisaged. There were two principal reasons for this. Firstly the metal cupboards require support, either by

being secured back to back if free standing or by securing to a wall as would have been necessary in our building. Secondly the drawers, which are obtained from the same supplier (Stevenson Blake) as the entirely wooden units, are of slightly different dimensions so would not have been interchangeable with the existing units. This was essential as the Hymenoptera collection needed to overlap the older and new units.

When it had been decided to go ahead with the wooden units, there was discussion with the suppliers on the type of wood used. The Natural History Museum specify that the drawers supplied to them should not be of tropical hardwood construction, while it was ascertained that the integral wooden cabinets including the four previously purchased by us are specified as of 'traditional mahogany construction. As the drawers used in the metal cupboards are of 'bass-wood' (otherwise described as American limewood) construction, we requested that this type of wood also be used for us. The cabinet body is principally chipboard with a mahogany finish but the door is usually mahogany. As the basswood is apparently not hard enough for door construction, we were informed that ash wood was used as a substitute for the doors.

This having been agreed, ten 15 drawer units were ordered, the cost being covered by previous and subsequent sales of cabinets. In the two previous annual reports I have mentioned that cabinets were available for sale and sales have continued steadily. A further seven cabinets have been sold in the past year, including the two 40 drawer cabinets formerly housing the Hymenoptera and Diptera. We don't have any further cabinets for sale at present although a number of store boxes are currently available for sale. I am, however, keeping note of anyone interested in purchase of cabinets so that they can be given priority in the future.

The transfer of the sawflies to new cabinets completed the clearance of the old Hymenoptera cabinet. At the same time I incorporated my own sawfly collection, which like the aculeates last year, is a donation to the Society. This has benefited me in providing more shelf space at home for boxes of Diptera. Further donations of sawflies have also been made by Andrew Halstead. The sawflies have been arranged according to the *Compendium of European Sawflies* by Andrew Liston, privately published in 1995 and we now have 320 of about 500 British species. A few other European species have also been included.

The new layout of the Diptera was a longer job, carried out in January this year. The main collection had previously been laid out (in the late 1970s) according to the 1976 check list so the opportunity was taken to arrange the collection according to the recent (1998) revised check list. With the amount of drawer space about doubled, it has been possible to more effectively provide space for additional species. The collection currently includes about 1900 species with strengths in craneflies, 'Larger Brachycera', Syrphidae, Tephritidae and calypterates. Space has been provided for species of all families except chornomids, cecidomyiids and phorids of which we have no material and which are usually slide mounted by specialists, eliminating 1500 species but leaving plenty of scope for additions to bring us up to the total of 5200 British species in the remaining families. I will continue to incorporate material from my own collection, but will welcome further donations from other dipterists to improve the value of the collection. I am grateful to Graham Collins, Peter Dyte, David Gibbs, John Phillips and Bernard Verdcourt for recent donations of particular species of Diptera.

Cyril Hammond's Diptera collection, which was received 20 years ago, was until now kept separate. It is strong in 'Larger Brachycera', Syrphidae and Tachinidae; particularly in the Syrphidae it contains a number of species not otherwise represented in the Society's collections. It was decided now to incorporate it, so as to

facilitate use of the collections, but in order to clearly distinguish his specimens a yellow accession label has been placed on every specimen; Cyril's name also appears on most data labels whereas H. W. Andrews, whose collection forms the bulk of our Diptera, omitted his name from labels.

Some other more recently received Diptera, especially from Eric Brandford's collection, have only partially been incorporated as much identification work remains to be done. I have, however, determined and incorporated his moth flies (Psychodidae), a family not previously represented. Large numbers of these had been stored by him dry in tubes. They have been macerated and a selection mounted in DMHF. There were 15 species, including the second British record of *Tinearia lativentris* from Horsham, Sussex, a female collected in August 1991. Like many of the specimens it was taken from a light trough indoors, which he evidently found to be a prolific source of this family.

In addition to the donors previously mentioned, I am also grateful to Jonty Denton for donations of Coleoptera and Matthew Smith of aculeate Hymenoptera.

We have also received three larger batches of specimens during the year. Four boxes of European butterflies and a microscope were received as part of a bequest from the late Sam Carter. A wide range of material was also received from the collection of the late John Sankey. I reported last year that we had received his Coleoptera, but we were later offered anything else that we would like to have from his collection of other orders, which mostly comprised material from Surrey and various parts of southern Europe. I visited his home to see what was available and it was decided not to take his Lepidoptera, but most of the material of other orders was accepted. This included mostly unnamed specimens of British Diptera, Hymenoptera and Heteroptera, as well as British and European Neuroptera and Orthoptera. I am grateful to his widow Mrs Anne Sankey for this donation and the assistance provided during my visit.

The third major donation was from Charles Mackechnie Jarvis, who offered us the residue of his collection. He had given his main Coleoptera collection to the Liverpool Museum some years ago, but still retained duplicate Coleoptera and some material of other orders. I visited him and received a 6 drawer minicabinet and about 30 store boxes, mainly containing British beetles including material from Shetland and the Scillies, but also Lepidoptera, European Neuroptera and some exotic Coleoptera and aculeates. The exotic material includes two harlequin beetles, a giant goliath beetle and a range of scarabs and lucanids. These only take up a small amount of drawer space but rival Cyril Hammond's four drawers of tropical butterflies to impress occasional non-entomological visitors.

I also received from Charles Mackechnie Jarvis twenty notebooks, mainly on Surrey Coleoptera, which had been compiled by F. J. Coulson. These were welcome as we already had a shorter set of Coulson's notebooks, which have now been brought together. I am grateful to Charles for these donations and for the hospitality shown to me by him and his wife during my visit to Salisbury.

Several specialists have kindly determined material from recent accessions or corrected determinations of specimens in the collection. In this area my thanks are due to Peter Barnard for Trichoptera, Jonty Denton for Coleoptera, Colin Plant for Neuroptera and several people for Hymenoptera, Andrew Halstead for sawflies, Chris Raper for some parasitic wasps, Matthew Smith and Raymond Uffen for aculeates.

The biennial loan of the Bretherton collection from the Reading Museum has been renewed again and I understand that this will continue to be renewed on a two yearly basis for the foreseeable future.

Following the reorganisation of collections and sales of cabinets, we have now achieved sufficient space to accommodate two further tables and these will be obtained shortly to provide more working space at Workshops and Open Days.

Finally, I have to comment on a less happy matter, that of thefts of butterflies from the Society's collection. I was already aware that this had occurred when giving my previous annual report and this was the reason for the mention of security, but I was not then sure of the extent of the problem. This became clearer subsequently, leading me to add an article on the subject following my report, when it was published in the Journal in August. Details were given there of particular specimens which could be certainly identified as missing. More recently the Bright collection, containing many aberrations of blues, has been checked by Rupert Barrington, who had fortunately photographed most of the more important specimens some years ago. I am pleased to report that only one of the specimens photographed by him could be confirmed as missing, a gynandromorph of the common blue (*Polyommatus iscarus* subspecies *mariscolore*), but adjacent pin holes suggest that at least four of the series of 20 gynandromorphs of this species had been removed. As reported in the article, the Bright collection and the two units containing British butterflies are now kept locked and keys are only issued on request, so that closer control of access can be maintained in future.

Early in the year we had further alarm activations by spiders, flies and sundry livestock of a nocturnal nature. A survey by the alarm company highlighted the offending sensor in the lobby as being too sensitive. This was replaced and there have been no more call-outs since—perhaps we have at last solved another perennial problem.

PETER CHANDLER

EDITOR'S REPORT

The progress made last year in catching up with publication dates for the Journal has been maintained this year, helped by a good number of articles and other contributions. After a slow start all parts of the Journal were published within the calendar year. The publication dates being April, August, November and December. The first and last issues were 56 pages, the November issue was 72 pages, and the August issue 64 pages, totalling 248 in the year.

As announced last year a revised "Instructions to Authors" has been published. One change to the production of colour plates has been instigated this year. The colour plates are now printed directly onto the page rather than a separate plate. This gives greater flexibility for placing individual colour photographs into papers. It also allows further colour plates in the Journal at little more cost than the agreed number for the year.

Together with reports of the Society Indoor and Field meetings, the Annual Exhibition report and Officers reports, Volume 12 contained 17 articles and 23 short communications. The articles were fewer in number than in 1998 and varied greatly in length. In fact a few longer articles assist in keeping the Journal published on time. It is, however, a thin line between the right balance and delays in publication. If all articles were long then delays would occur! There were 5 articles on Hymenoptera, 4 on Lepidoptera, 3 on Diptera, 2 on Coleoptera, 1 on Hemiptera and 2 dealing with insect surveys. While there may have been less articles than last year some of the 'short communications' are long but seem to lend themselves to the format rather than being made into a short article. I considered last year that most articles and

short communications were broadly taxonomic in content. This year, while based on good taxonomy, they seem to be based largely on the results of good fieldwork, one of the key strengths of the Society. However, as I prepare this, I have less field meetings reports submitted than usual. As well as to field meeting leaders I would renew my plea to County moth recorders and to BWARS and Dipterists Forum to send short reports of the season's activities.

I would like again to take this opportunity to thank all those who have given their time on behalf of the Society: in reviewing papers, in the writing of the Annual Exhibition reports and to proof reading as well as other aspects that help the production.

MICHAEL R. WILSON

THE 1999 PRESIDENTIAL ADDRESS—PART 1—REPORT

STEPHEN MILES

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In common with all my recent predecessors the quiet efficiency of the other Officers of Council has made my job as President, arduous as it is, considerably easier than it otherwise might have been. I pay particular tribute to John Muggleton and Andrew Halstead in this regard. Their splendid efficiency in 1999 2000 has required almost no corrections, contentious or otherwise, to the Council or Meeting minutes. I am also most grateful to Mark Telfer for the volunteer role he performed at one meeting during the year.

I would also like to especially thank those who carry out multiple tasks or background tasks which considerably aid the smooth running of the Society. Those such as Ian McLean as he undertakes three separate functions, which may not all be realised by those who do not attend regular meetings. Not only does he organise each season's indoor meetings programme and speakers for the workshop meetings held at Dinton Pastures, he is also the lanternist and chairman of the publications committee. The latter responsibility a considerable one: the membership should appreciate that this includes all the necessary liaison with the team preparing and producing the new book on *British soldierflies and their allies* to be published by the Society. The other members of this team are Alan Stubbs and Martin Drake, the authors and Malcolm Storey who is heavily involved in the pre-production phase.

Continuing thanks are due to Roger Hawkins, who assists with proof corrections for the journal, helps in the preparation of membership lists and produces the Publications Committee minutes all in addition to his main function as Assistant Treasurer and to David Young in covering the repetitive but absolutely essential function of distributing the Society's journal and notices. David also prepares the indexes of the journal and a member of his family provides assistance in developing and maintaining the BENHS Internet web-site.

We are also indebted to Tony Pickles not only for his careful management of the Society's finances but additionally we have been grateful for his assiduousness in seeking out solutions to the potential problems with our insurance cover. This is still an ongoing problem which we would have to face if an accident occurred during a member-organised field meeting on the Government's Forest Authority land holdings.

More thanks are due to Ian Sims for his careful submission to the bookbinders of runs of our journals for binding, thereby maintaining their volume completeness and consistent appearance. Your Council and I have also much appreciated the considerable efforts of Gavin Boyd in maintaining sales of the Society's publications and providing regular statistics on this effort on our behalf. In combination with Ian Sims this workload suffered a short-term increase as they both prepared for sale the excess numbers of our journals that were sold at the 1999 Annual Exhibition, an effort successful in releasing more space for the continually growing library.

Considerable thanks are also due to those Council Members who open up and maintain our premises at Dinton Pastures, particularly to those who respond to the occasional false alarm call-outs, sometimes in the middle of the night. To the curator, Peter Chandler, additional appreciation is due because of his success in raising further assets for the Society through insect cabinet sales. We are also indebted to Peter in reporting to Council on the management activities of our landlords, Wokingham District Council, in maintaining the country parks at both Dinton Pastures and California, near Crowthorne, where these might impinge on local invertebrate populations. This is a valuable conservation role. Great thanks continue to be due to Paul Waring for organising the Society's expanded field meetings programme and to Malcolm Scoble for maintaining a part of our international support to entomology through the Hering Fund for leaf-mining research. Thanks are due to all those who have conducted workshops at Dinton Pastures during the last year, thereby enhancing our reputation, as a Society, for providing practical identification and field instruction. Finally the Editor, Mike Wilson, is to be congratulated on his considerable efforts during the year in bringing the journal issues back up to their normal schedule.

The highlight of the year, the Annual Exhibition, was again splendidly organised by Mike Simmons. The attendance of members plus visitors at the exhibition continues to drift lower, an issue of some concern to Council. The response to the questionnaire given out to those attending the 1999 event however, revealed that although the main reason for dissatisfaction with the venue was parking, almost 73% of those who completed the form remained happy with the location. There was a good attendance at the dinner, the standard of the meal was very good and it was pleasing to see some of the younger members attending.

Your Council was also represented on the Joint Committee for the Conservation of British Invertebrates (JCCBI) by Raymond Uffen and John Phillips. Both of these members contribute their energy to our growing number of conservation concerns. John Phillips, together with John Muggleton was instrumental in guiding through the Conservation Working Group's joint initiative to combine with Butterfly Conservation to study the UK Biodiversity Action Plan moth species. I urge more of our members to become involved in this project to use their considerable knowledge to benefit the conservation of British moths.

Thanks are due to all the Officers, ordinary members of Council and to those who sit on all the other Society committees for their support during the year.

It is gratifying to report that the Society's rooms were subject to less humidity variation this year; thanks are due to those who have advised and helped us with this persistent problem. Early in my year it was sad to hear of the loss reported from the collections of some set specimens. This theft is a betrayal of trust that I view extremely seriously but I suppose it would be politically incorrect to wish that the perpetrator should be the subject of some sort of accident, whoever he or she may be! A far more satisfactory solution would be for the perpetrator, in an act of contrition, to return these specimens anonymously.

During my term of office, sadly, the Society received notice of the passing away of five members.

Mr R. H. Mays died in June 1998, having joined the Society in 1972. He was interested in butterflies and moths, and the history of entomology. Mr Mays was the author of a biography of Henry Doubleday.

Mr Darren Walker was a relatively new member who was interested in the Lepidoptera. Mr Walker died at the exceptionally early age of 31.

Mr John M. Boyd died aged 84 and had been a lifelong naturalist. He was interested in the Odonata, and insect and plant photography. He also managed two reserves for the Somerset Wildlife Trust and gave many talks and slide shows to others on invertebrates. Mr Boyd was also still attending both our workshops and those of the Somerset Invertebrate Group up to the time of his death.

Mr Steve Church had been a member since 1980 and was interested in the Lepidoptera. He founded the Bioscan Environmental Consultancy. He had also been a major contributor of information to Jim Porter's book on Lepidoptera larvae.

Finally, Mr B. R. Baker died on 13 February 2000. Brian was a former President of the Society and a Deputy Director of Reading Museum. He was also a founder member of the Berkshire, Buckinghamshire and Oxfordshire Naturalist's Trust (BBONT). Brian was a contributor to Volume 2 of *The moths and butterflies of Great Britain and Ireland* because of his expertise in the clearwings (Sesiidae). He was particularly associated with Lepidoptera work in Berkshire as the county recorder. This culminated in his major work, that wonderful local list and book, *The butterflies and moths of Berkshire* published in 1994.

We have already stood in memory of these members at previous meetings so I will not ask you to do so again.

In pursuance of our continued support of major natural history organisations seeking to purchase major sites as they become available, your Council donated £250 to The Royal Society for the Protection of Birds (RSPB) appeal for Dingle Marshes in Suffolk. Subsequently thanks for this donation were received back from the RSPB and our help was also sought to survey the insects of this site in the future.

It has been a challenge to be your President. I hope that my approach to the second part of this address will not be seen as too opinionated but I do believe that at this point in time we need, as a Society, to have some sort of vision for our future role as conservation entomologists. Rather like Bill Gates describing the "road ahead" for Microsoft a few years ago, I believe someone needs to put his head on the chopping block, and in the history of entomology an amateur viewpoint is as good as any.

SHORT COMMUNICATION

***Myrrha octodecimguttata* (L.) (Coleoptera: Coccinellidae), a newly recorded host of *Dinocampus coccinellae* (Schrank) (Hymenoptera: Braconidae).** *Dinocampus coccinellae* (Schrank) is a cosmopolitan parasitoid of diverse ladybirds of the subfamily Coccinellidae (Ceryngier & Hodek, 1996). We recently obtained a specimen of *D. coccinellae* from an individual of *Myrrha octodecimguttata* (L.), the 18-spot ladybird. The parasitoid was a female, as is typical for individuals of this parthenogenetic species. The ladybird was one of several *M. octodecimguttata* collected, along with a number of other species, at Esher Common, Surrey, England in August 1998. At this site *M. octodecimguttata* is common on *Pinus sylvestris* L., Scots pine. The ladybirds were overwintered in an insectary at ambient outdoor temperature and, both before and after overwintering, were maintained primarily on a diet of artificial ladybird food (Henderson & Albrecht, 1988; Majerus & Kearns, 1989). The parasitoid larva emerged from the ladybird at some point after the overwintering period, forming its cocoon underneath the host, as is typical for this species. Emergence of the adult was successful.

Ceryngier & Hodek (1996) do not include *M. octodecimguttata* in their comprehensive world list of *D. coccinellae* hosts. Furthermore, Majerus (1997) did not detect this parasitoid in two samples of British *M. octodecimguttata* comprising 22 and 35 individuals. In view of Majerus' data, it seems that *M. octodecimguttata* is a rare host for *D. coccinellae*, although successful parasitism of this ladybird species can sometimes take place.

The preserved parasitoid, cocoon and ladybird host have been deposited with the National Museums of Scotland. JOHN J. SLOGGETT & MICHAEL E. N. MAJERUS, Department of Genetics, Downing Street, Cambridge CB2 3EH, UK. (Current address of JJS: Institute of Ecology, Friedrich Schiller University, Dornburger Straße 159, D-07743 Jena, Germany.)

REFERENCES

Ceryngier, P. & Hodek, I. 1996. Enemies of Coccinellidae. In Hodek I. & Honěk, A. *Ecology of Coccinellidae*. Kluwer Academic Publishers, Dordrecht. pp. 319–350.

Henderson, S. A. & Albrecht, J. S. M. 1988. An artificial diet for maintaining ladybirds. *Entomologist's Record and Journal of Variation*. **100**: 261–264.

Majerus, M. E. N. 1997. Parasitization of British ladybirds by *Dinocampus coccinellae* (Schrank) (Hymenoptera: Braconidae). *British Journal of Entomology and Natural History*. **10**: 15–24.

Majerus, M. E. N. & Kearns, P. W. E. 1989. *Ladybirds*. Naturalists' Handbooks 10. Richmond Publishing Company, Slough. 103 pp.

UK DIPTERISTS FORUM ANNUAL MEETING & SUPPER
Cardiff, 25–26 November 2000

This year the Annual Meeting of the UK Dipterists Forum will be returning to the National Museum & Gallery of Wales in Cardiff, on the weekend of 25 26 November 2000. As in the very successful 1998 meeting, this will be a residential weekend comprising presentations, exhibition, AGM and informal meetings on the Saturday, followed by workshops and access to the collections on the Sunday. There will be a Dipterists Supper on the Saturday evening. Further details will be announced in the summer issue of the *Dipterists Bulletin*; enquiries in the meantime to be addressed to either Mike Wilson at the museum (Tel: 029 20573263; e-mail: mike.wilson *@* nmgw.ac.uk) or the local organiser, David Clements (Tel: 029 20307878; e-mail: david.clements1 *(a)* tesco.net).

AN UPDATE ON THE BRITISH HOVERFLY LIST

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The BENHS issued a reprint of *British Hoverflies* in May 2000 because the book went out of print towards the end of 1999. This reprint of 500 copies includes, after the original text and plates, the *Second Supplement*, originally published separately in 1996, and a short concluding section titled *Update on the British List*, current to the beginning of the year 2000. Together, these enable all currently named British hoverflies to be identified, as well as giving references to many recent studies of hoverflies in Britain and abroad. Unfortunately, it was not possible to make changes to the original text of *British Hoverflies* for this reprint, although it is intended that the book will be issued as a revised edition when the current reprint is sold out, probably in about 2005. In order to make a summary of the most recent changes more widely available to those who have already bought *British Hoverflies* and the *Second Supplement*, it has been agreed to publish the *Update on the British List* in the Society's Journal.

INTRODUCTION

This *Update on the British List*, contains some additional notes covering a further four species that have been added to the British list since 1996 (two were added in 1996 after the *Second Supplement* went to press), and lists those names revised in accord with the latest checklist of Diptera of the British Isles (Chandler, 1998). The total hoverfly fauna for the British Isles now comprises 267 species with valid names.

When using *British Hoverflies*, you may find it helpful to mark up the original keys and text to incorporate the species splits and name changes that have taken place since 1983. Using the *Second Supplement* and the *Update on the British List* as the sources for updating your copy should make this a fairly straightforward process. The page numbers of *British Hoverflies*, where changes are needed to the keys and text, are cited in both the Supplement and Update to assist you.

When you submit records to the Hoverfly Recording Scheme, or if you publish records and observations, it is recommended that you use the names from the new checklist (Chandler, 1998). These names will be recognised as the new standard by journal editors and in databases.

Apart from promoting the study of hoverflies in Britain, the book has also sold well abroad. It has contributed to the renaissance of hoverfly studies in Europe where there has been a substantial increase in taxonomic and national revisions, including mapping in some countries.

As regards Britain, since 1996 there have been further county atlases published, notably for Somerset (Levy & Levy, 1998) and Surrey (Morris, 1998). In the year 2000, BRC plan to publish an atlas, which summarises knowledge of distribution in Great Britain, flight periods and ecology.

The UK Biodiversity Action Plan is based upon both Species Action Plans and Habitat Action Plans; the latter will enable many threatened species without Action Plans (including hoverflies) to be conserved. Already some hoverflies have Species Action Plans in progress, currently including *Blera fallax*, *Callicera spinolae*, *Chrysotoxum octomaculatum*, *Doros profuges*, *Eristalis cryptarum* and *Hammerschmidtia ferruginea* (*Myolepta potens* has a species statement). The British

Entomological and Natural History Society is Lead Partner for *Chrysotoxum octomaculatum* and two other flies.

The outlook for continuing to increase our knowledge of hoverflies looks bright, whilst their value for raising the profile and understanding of insects in conservation circles is rising. Hopefully, the number of people recording, or at least in sympathy with, these 'friendly' insects will continue to grow.

Changes in the British Checklist

Additions since the Second Supplement 1996

There have been four published additions.

Cheilosia psilophthalma Becker, 1894 (added by Speight, 1996): keys pp. 79 (group C, *C. mutabilis*) and 87 (group J, C. *praecox* now *C. urbana*)

This species is said to resemble *mutabilis* or *praecox*, which are relatively small narrow species. It occurs in early spring in Ireland and may have been overlooked in Britain. It is not easy to recognise but the following key may help.

1. Arista pubescent. Hind tarsi entirely dark. Tergites 2–4 with median black hairs (very short in female). Male frons thickly grey dusted. Female eye hairs very short or absent. [Claws bicoloured, basal half brownish yellow but apical half black] *mutabilis*
- Arista bare. Hind tarsi partly yellow. Tergites 2–4 with entirely greyish-white hairs. Male frons varies from dust along eye margin to entirely dusted. Female eye hairs long and distinct. [Claws dark or bicoloured] 2
2. Claws bicoloured. Male frons not swollen. Female third antennal segment one and a half times as long as deep. *urbana* (formerly *praecox*)
- Claws dark or vaguely bicoloured. Male frons somewhat swollen. Female third antennal segment hardly longer than deep. *psilophthalma*

Helophilus affinis Wahlberg, 1844 (added by Stuke, 1996): key p. 98

Only known from a specimen taken in August 1982 on Fair Isle, a remote island between Orkney and Shetland. It may have been a migrant from Scandinavia. Tergites 2–4 have the hind margin entirely black, whereas other British species, except for *H. groenlandicus*, are yellow in this position. *H. affinis* has the front tarsi with at least the basal joints yellowish brown, while in *H. groenlandicus* the front tarsi are entirely black (Nielsen, 1997).

Platycheirus splendidus Rotheray, 1998 (added by Rotheray, 1998): key pp. 50 (males) and 53 (females)

This species new to science has been separated from *scutatus*. It is widespread in Britain but differs ecologically from *scutatus* in only having a spring flight period (mid April–May, extending to early July) and its larvae occur on trees (including aphid leaf galls on elm) as well as the usual herbaceous plants.

1. Front and mid legs extensively pale beneath. Dustless median stripe slightly broader than strong facial knob. Face at base with a strongly developed lip (side view). *splendidus*
   Front and mid legs black or mainly so beneath. Dustless median stripe not broader than smallish facial knob. Face at base with a scarcely developed lip (side view). *scutatus*

Syrphus rectus Osten Sacken, 1875 (added by Speight, 1999): key p. 72

Specimens have been found in Ireland and elsewhere in Europe that appear to correspond with North American *Syrphus rectus*. These are ascribed to a new

subspecies, *bretolensis* Goeldlin, 1996. However, the question remains as to whether European examples are merely variants of a common species.

The snag is that males of *rectus* are indistinguishable from *vitripennis* (the usual sex for reliably distinguishing species). The female of *rectus* has mainly yellow hind femora, thus resembling *ribesii*, but the complete covering of microtrichia on the wings equates with *vitripennis*. Thus it is possible that European *rectus* will prove to be a female form of *vitripennis* with an exceptional extent of yellow on the hind legs.

This throws into confusion many previous records within *Syrphus*. In practice, males will have to be identified according to earlier keys, which exclude *rectus*. For females, *ribesii*, with its mainly yellow hind femora, will need care; in the field one should be looking for the hint of *rectus* leg markings, a darkish stripe on the anterior surface of the hind femur about half way along, or more extensive darkening as a ring. The microtrichia pattern on the wings should be checked on all specimens to be sure, even those with plain *ribesii* hind legs. Records of *Syrphus* really need a note of the sex, and whether records are *sensu lato* (*s.l.* = in the broad sense, using earlier keys) or *sensu stricto* (*s.s.* = in the restricted or narrow sense, taking *rectus* into account).

— The reduced pattern of microtrichia in the second basal cell is illustrated in the keys (p. 72 of the main text); see also a note about rare specimens with spots on the abdomen (Second Supplement, p. 12). With great care and in good light, a $\times 20$ hand lens should reveal whether this wing cell is entirely or only about half covered in minute short spiky hairs (a microscope at $\times 20$ or $\times 40$ is ideal).

Female key using mitrotrichia (adapted from Speight, 1999).

1. Wings entirely covered in microtrichia, including the second basal cell. 2
   Wings with extensive areas bare of microtrichia, particularly within the second basal cell. 3
2. Hind femora mainly black/dark brown (yellow apex). *torvus*
— Hind femora mainly yellow (narrowly dark at base). *ribesii*
3. Hind femora mainly black/dark brown (only apex yellow). *vitripennis*
   Hind femora mainly yellow (base narrowly dark, and often a median dark smudge at least anteriorly). *rectus*

A female *rectus* was captured in a Malaise trap in Glenveagh National Park, County Donagal, Ireland (Speight, 1999). The trap sample was for 12 August to 2 September 1999, sited at low altitude in unimproved, acid, *Molinia* grassland by a gentle slope with trees and scrub. Colin Plant exhibited a slightly teneral female *Syrphus* at the BENHS indoor meeting on 13 June 1990 (BENHS, 1991), which was initially thought to be an aberrant *Syrphus vitripennis*. However, following the publication of the paper by Speight (1999), it was re-examined and positively identified as *Syrphus rectus* subspecies *bretolensis*. It emerged during June 1987 from *Prunus spinosa* leaves that were being fed to Lepidoptera larvae; unfortunately the puparium could not be located and had probably been destroyed by the caterpillars. The leaves were collected in a garden at Bishop's Stortford, Hertfordshire a few days earlier. The few other European records come from a motorway lay-by in Germany, a maize field in Luxembourg and a Swiss alpine pass. Hence *rectus* is probably a very mobile species that could turn up practically anywhere.

Table 1. Changes in the British Hoverfly fauna since the *Second Supplement* 1996.

Old name	1983 page number	1996 page number	Current name
Arctophila fulva	**107**, 113, **214**, 216, 234, **Pl. 8 fig. 8**		Arctophila **superbiens**
Baccha obscuripennis	**47**, **116**, 231		Baccha **elongata** (amalgamated)
Brachypalpoides lenta	**110**, **111**, 217, **219**, 225, 234, **Pl. 9 fig. 14**		Brachypalpoides **lentus**
Cheilosia globulipes	12, **87**, 164, **167**, 172, 232, **Pl. 6 fig. 7**		Cheilosia **urbana**
Cheilosia honesta	**75**, **78**, 162, 165, **168**, 174, 175, 232	22	Cheilosia **lasiopa**
Cheilosia intonsa	**77**, **78**, 81, 162, 165, 167, **169**, 232		Cheilosia **latifrons**
Cheilosia praecox	12, 23, 83, 84, **87**, 163, 164, 167, **172**, 233	8, 12, 13, 22	Cheilosia **urbana**
New in this update			**Cheilosia psilophthalma**
Cheilosia laskai	**80**, **81**, 162, 163, **169**, 172, 173, 232		Cheilosia **ahenea**
Cheilosia nasutula	**80**, **81**, 162, 164, 169, **170**, 171, 173, 233		Cheilosia **vicina**
Chrysogaster chalybeata	10, **90**, **91**, **181**, 233, **Pl. 7 fig. 4**		Chrysogaster **cemiteriorum**
Chrysogaster hirtella	10, 23, 30, **90**, **181**, 182, 183, 233, **Pl. 7 fig. 3**		**Melanogaster** hirtella
Chrysogaster macquarti	10, 23, **90**, 181, **182**, 233		**Melanogaster aerosa**
Dasysyrphus lunulatus	44, **60**, **132**, 133, 231, **Pl. 3 fig. 10**	9, 10, 18	Dasysyrphus **pinastri**
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Epistrophe (Epistrophella) euchroma	43, **61**, 137, 144, 232, **Pl. 2 fig. 3**		**Meligramma euchromum**
Eristalis nemorum	24, **98**, 193, 194, **195**, 233, **Pl. 11 fig. 7**	25	Eristalis **interruptus**
Eristalis pratorum		14, 25, 28	Eristalis **similis**
New in this update			**Helophilus affinis**
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Old name	1983 page number	1996 page number	Current name
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Megasyrphus annulipes	22, **63**, **139**, 155, 232, **Pl. 3 fig. 18**	19	**Eriozona erratica**
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Sphegina kimakowiczii	**94**, 188, **189**, 233		Sphegina **elegans**
New in this update			**Syrphus rectus** ssp. *bretolensis*

Additions pending

Extra species occur in Britain, mainly stemming from studies by specialists outside Great Britain; descriptions of species new to science are pending. Splits are expected for instance in *Melanostoma mellinum*, *M. scalare*, *Platycheirus scutatus*, *Xanthogramma pedissequum* and *Cheilosia albitarsis*. Additionally some recently described European species may yet be found in Britain.

Recent published refinements on the separation of *Melanostoma mellinum* and *M. scalare* are not reliable. The following characters are among those that may assist recognition of segregates within potential species complexes.

— Dusting on frons
— Third antennal shape and colour pattern; relative length of arista
— Profile of face
— Thoracic postalar calli colour (rarely orange)
— Leg colour
— Shape of second tergite (length to width variable in both 'species')
— Colour of sternites

Checklist amendments

The recent revision of the British checklist of Diptera by Chandler (1998) assessed various potential changes in names of British hoverflies, including reappraisal of spellings. There is no universal consensus over some name changes. Unfortunately authors outside Britain have often given greatest priority to long forgotten early names, rather than maintain long-established usage. The British list has erred on the side of stability where there is no consensus, or where chaos is introduced by such circumstances as exchanging names. Hence the list is pragmatic, accepting a big step towards European consensus but stepping aside from changes which are still volatile (as in species name exchanges in *Chrysotoxum* and *Xanthogramma*; an application has been made to International Code of Zoological Nomenclature (ICZN) to fix the names used in *British Hoverflies*).

Table 1 is in alphabetical order, incorporating changes since the *Second Supplement* (1996) for the fauna of Britain and Ireland. All the name changes are included in Chandler (1998), except for the change of name for the species formerly known here as *Cheilosia praecox* to *Cheilosia urbana* (see Claussen and Speight, 1999). The page numbers for *British Hoverflies* (1983) and *Second Supplement* (1996) are derived from the respective indexes to assist with annotations. The names changed in the last column are emboldened for clarity and emphasis.

Acknowledgement

Thanks are passed to Peter Chandler for confirming the list of changes given in the above table.

References

BENHS 1991. Minutes of the indoor meeting 13 June 1990. *British Journal of Entomology and Natural History* **4**: 48.

Chandler, P. J. 1998. Checklists of Insects of the British Isles (New Series). Part 1: *Diptera Handbooks for the Identification of British Insects* **12**.

Claussen, C. & Speight, M. C. D. 1999. On the identity of *Cheilosia ruralis* (Meigen, 1822)(Diptera, Syrphidae)—with a revision of its synonymies. *Volucella* **4**: 93–102.
Levy, E. T., & Levy, D. A. 1998. *Somerset Hoverflies*. E. T. Levy & D. A. Levy.
Morris, R. K. A. 1998. *Hoverflies of Surrey*. Surrey Wildlife Trust.
Nielsen, T. R. 1997. The hoverfly genera *Anasimyia* Schiner, *Helophilus* Meigen, *Parhelophilus* Girschner and *Sericomyia* Meigen in Norway (Diptera, Syrphidae). *Fauna Norvegica Series B* **44**: 107–122.
Rotheray, G. E. 1998. *Platycheirus splendidus* sp. n. from Britain formerly confused with *Platycheirus scutatus* (Diptera: Syrphidae). *Entomologists Gazette* **49**: 271–276.
Speight, M. C. D. 1996. *Cheilosia psilophthalma* and *Odinia boletina*: insects new to Ireland and *Sapromyza sexpunctata* confirmed as an Irish species (Diptera: Syrphidae, Odiniidae & Lauxaniidae). *Irish Naturalists Journal* **25**: 178–182.
Speight, M. C. D. 1999. *Syrphus rectus* Osten Sacken and its potential implications to the recording of *Syrphus* species. *Dipterists Digest* (Second Series) **6**: 85–91.
Stubbs, A. E. 1998. *Cheilosia psilophthalma* added to the Irish list. Could it occur in Britain? *Hoverfly Newsletter* No. 25: 8–9.
Stuke, J.-H. 1996. *Helophilus affinis* new to the British Isles (Diptera, Syrphidae). *Dipterists Digest* (Second Series) **3**: 45–46.

SHORT COMMUNICATION

A relict population of *Armadillidium pulchellum* (Zencker) (Isopoda: Armadillidiidae) in the heathlands of south-east England. *A. pulchellum* is a small pill woodlouse which is mainly confined to open, long-established, semi-natural vegetation types developed on freely-draining soils – particularly heathlands and limestone pastures. It is a speciality of north-western Europe, with the greatest concentration of known sites in Britain, where its distribution is distinctly northern and western – from Cornwall to Galloway (Harding & Sutton, 1985).

It was first discovered in the south-east at Bramshill (SU76), north Hampshire, under loose bark on felled Scots pine (Hopkin, 1987). The site is a former sandy heath which has been converted to commercial conifer plantations. Single individuals were found on two occasions (S. P. Hopkin, pers. comm.). In 1998 a small colony of the woodlouse was found by myself, associated with a bank of open sandy heathland within the extensive self-sown pine stands on Black Down (SU 921303), West Sussex. The woodlice were numerous in the litter beneath the heather bushes.

The more westerly heaths of the south-east support a number of such north-western species: the bug *Globiceps juniperi* Reuter is another example known from the relict heathlands of Black Down. These heaths appear to be transitional between the typical lowland dry sandy heaths of the south-east and the damper heaths of western coasts and hills. K. N. A. Alexander, The National Trust, 33 Sheep Street, Cirencester, Gloucestershire GL7 1RQ.

References

Harding, P. T. & Sutton, S. L. 1985. *Woodlice in Britain and Ireland: Distribution and Habitat*. Institute of Terrestrial Ecology, Huntingdon.
Hopkin, S. P. 1987. Biogeography of Woodlice in Britain and Ireland. *Isopoda* **1**: 21–36.

SHORT COMMUNICATION

Chalkhill blue and small copper butterflies feeding on dung – That butterflies visit unusual food sources such as faeces and urine after the minerals and salts which they cannot easily get from nectar or honeydew is a phenomenon well-known to entomologists. But apart from the odd excursions of the purple emperor to dripping exhaust pipes and puddles fertilized by the call of nature, it seems to be an observation infrequently noted of British species – most reports of this behaviour are of exotic and tropical butterflies.

I was therefore intrigued to find a specimen of the chalkhill blue feeding on dog dung recently. On 25.vi.1997, while visiting the hilltop Chilterns woodlands of the National Trust's Sharpenhoe Clappers, in Bedfordshire, I took a few minutes to photograph marbled whites and chalkhill blues resting between bursts of flight as the scattered clouds occasionally shaded out the sun. During one pursuit, a blue landed on a piece of dog dung in the short limestone turf. The dung appeared rather dry, not fresh and aromatic, and thinking that it was simply resting on a suitable perch I took several pictures of the butterfly. However, it soon became apparent that the butterfly was not resting, it was feeding; its proboscis was extended and it was clearly probing with it (Fig. 1). The area it was probing does appear moist in the subsequent photographs. The butterfly continued feeding like this for several minutes before flying off. The hilltop path here is a popular dog-walking route and looking around it was obvious that there was a plentiful supply of the dung. I waited a short while, but no further blues, or other butterflies, visited the abundant canine droppings.

Having made a mental note of this behaviour, I then recalled a similar observation made several years ago. On Tunstall Heath, Suffolk, on 25.viii.1993, I stalked a small copper after a close-up photograph. When it finally came to rest, it was settled on a pile of rabbit pellets and spent some time wandering about (Fig. 2), apparently examining this potential food source. As is usual with rabbit droppings, the dung was

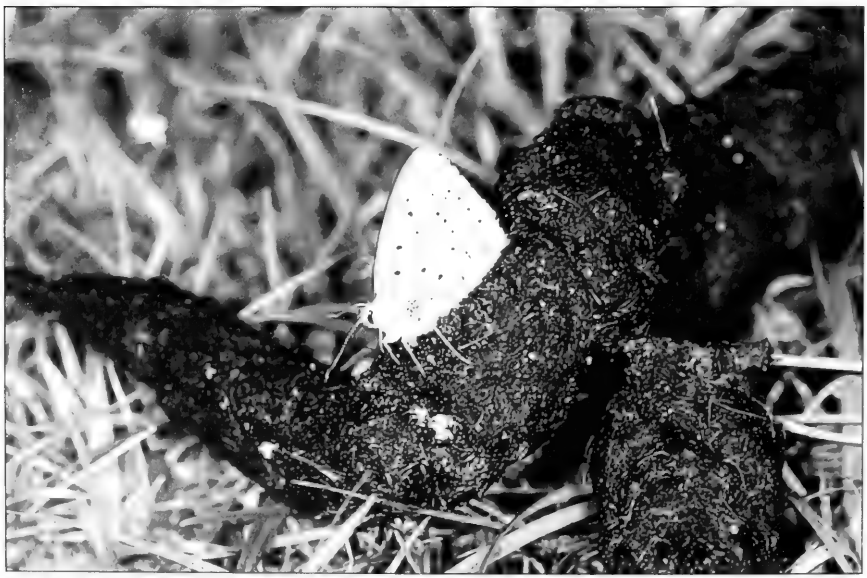

Fig. 1. Chalkhill blue butterfly feeding from dog dung.

Fig. 2. Small copper butterfly "feeding" on rabbit dung.

dry and crumbling, not at all fresh or moist as one might expect of something attractive to butterflies.

As an entomologist with a particular interest in beetles, I find dung a perfectly healthy habitat to examine closely. True, this interest in excreta has been described in varying degrees from disgusting to eccentric, but it is certainly an important and oft overlooked pabulum. I have found many surprising and unusual creatures that share my enthusiasm for dung, but in 35 years of looking, I have only found two British butterflies.

Thanks to the two National Trust officers, Keith Alexander of the NT biological survey team who suggested I look at the Chilterns site, and Graeme Cannon, chief warden of the NT Ashridge Estate, who administers it and confirmed permission to collect insects there. RICHARD A. JONES, 135 Friern Road, East Dulwich, London SE22 0AZ.

BOOK REVIEWS

World Catalogue of Insects Volume 1, Hydraenidae (Coleoptera) by Michael Hansen. Apollo Books, 1998, 168 pages, hardback, Danish Kroner 290,00 excl. postage. Volume 2, Hydrophiloidea (s. str.) (Coleoptera) by Michael Hansen, Apollo Books, 1999, hardback, Danish Kroner 690,00 excl. postage. Both available from Apollo Books, Kirkeby Sand 19, DK-5771 Stenstrup, Denmark.

Up to date and accurate catalogues are an essential tool of the taxonomist, especially for those working in species rich groups like Coleoptera, where new species are constantly being described and existing species re-assessed. There is a great need for new catalogues for almost all groups of Coleoptera and many other groups of insects.

This series of catalogues is intended to provide up to date and authoritative catalogues of different insect groups on a worldscale.

Both of these books by the same author have the same format. The last complete world catalogue for these groups was produced 75 years ago and the number of described species and genera in these has increased almost fourfold in the case of the Hydraenidae and approximately twofold in the case of the Hydrophiloidea.

These catalogues list all the taxa described up to 1997 for the Hydraenidae and 1999 for the Hydrophiloidea, with the supraspecific taxa arranged systematically following the most recent classification of these families. The species listed alphabetically under each genus or subgenus. For each taxon a reference is given to the original description. For genus-group names the type species and how and where the type species was designated is given. For species-group names the type locality, reference to lecto- or neotype designations and references to the first use of all different generic combinations is given. All synonyms, the most important misspellings and misinterpretations are listed chronologically under the valid name, with a reference to the first publication of the synonymy. The distribution of each species by zoogeographical region, country and in some cases smaller administrative regions is given.

Both catalogues include a list of fossil species attributed to recent genera and species excluded from the families. In the case of the Hydrophiloidea a list of replacement names of junior homonyms is given and other nomenclatural changes such as new synonymies and new combinations are listed. Both catalogues include an index to all the specific and supraspecific taxa treated.

The references listed are confined to those cited in the text, and primarily lists papers containing original descriptions, type species designations, lecto- and neotype designations and synonymies. For this reason these catalogues do not entirely supersede the volumes of the Coleopterorum Catalogus dealing with these groups, where papers dealing with biology and faunistics of each species would be listed.

These volumes are an essential tool for anyone working on the systematics of these groups. They will also provide a starting point for those attempting to make an inventory of the species recorded from any particular geographic area.

BRIAN LEVEY

Genera of the Trichoptera of Canada and adjoining or adjacent United States by F. Schmid. The Insects and Arachnids of Canada, Part 7. National Research Council of Canada, Ottawa, 1998, 319 pp. ISBN 0-660-16402-7. Price $39.95.

This is a translation of the French edition originally published in 1980, but includes much new information. Schmid was one of the greatest experts on adult caddisflies, who sadly died just as this book was published, and his clear and authoritative text has always been widely quoted in its French version. This English translation will help to make it widely available to many more people. It is a model of how to write such a handbook, with clear illustrations, easy keys and all morphological terms clearly explained, concluding with an extensive bibliography. Its value is not confined to Canada, because many of the genera are holarctic in distribution, and many European genera are included. Although the book has been brought up to date, Schmid deliberately adopted a conservative approach to the higher classification of the group, and his views may well be vindicated as further research continues to suggest that recent dramatic changes in the classification may not be very robust. Overall this is an essential reference work for anyone interested in this group of freshwater insects.

P. C. BARNARD

THE FOURTH NATIONAL MEETING OF THE ROYAL ENTOMOLOGICAL SOCIETY LIVERPOOL HOPE UNIVERSITY COLLEGE, 14–15 SEPTEMBER 2000

The previous three annual meetings of the Society have been highly successful in bringing together people from many different fields who are all interested in aspects of entomology. The fourth meeting, at Liverpool Hope University College, will again be an exciting multi-disciplinary meeting for both researchers with interests in insects, and entomologists who are interested in hearing about current entomological research. Entomology 2000 will be a two-day residential meeting. Accommodation will be in halls of residence at Hope Park, and presentations will be held nearby in our recently completed lecture theatre complex.

Offers of contributions on any entomological topic are welcome, but it is expected that many will fall within the following categories: Agricultural and Forest Entomology; Insect Molecular Biology; Conservation and Habitat Management; Insect Ecology & Evolutionary Biology; Insect Locomotion; Entomology in Education; Entomological Recording; Physiology; Insect–plant Interactions; Medical and Veterinary Entomology and Warning Signals and Defences in Insects.

Provisional Programme:

Wednesday 13 September—afternoon/evening registration for those who wish to arrive the day before and look around the area (evening bar + real ale).

Thursday 14 September— early morning registration and first oral sessions; lunch and poster session;
afternoon oral sessions;
evening sherry reception and poster session followed by conference meal (and late bar + real ale).

Friday 15 September— early morning registration followed by oral sessions; lunch and poster session;
afternoon oral sessions until about 4.30 pm;
close of conference.

Cost:

The cost to non-RES Members is £45* plus accommodation and meals (*there are reductions for (potential) RES Members/Fellows).

Further details:

For further details please contact Jon Delf/Mike Speed at Liverpool Hope University College, Hope Park, Liverpool L16 9JD, UK; tel: 0151 291 3592/20397; fax: 0151 291 3172; e-mail: Delfj@Hope.ac.uk or SpeedM@Hope.ac.uk; or visit http://www.royensoc.demon.co.uk or http://www.hope.ac.uk/ebs/ento2000/index.htm on the Internet.

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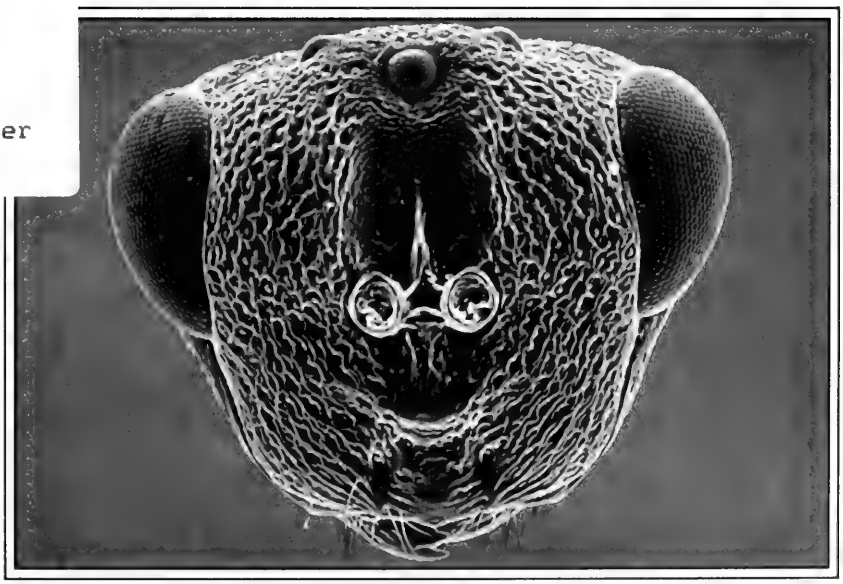
October 2000 ISSN 0952-7583 Vol. 13, Part 3

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY



BRITISH ENTOMOLOGICAL & NATURAL HISTORY SOCIETY

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY

Published by the British Entomological and Natural History Society and incorporating its Proceedings and Transactions

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British Journal of Entomology and Natural History is published by the British Entomological and Natural History Society, Dinton Pastures Country Park, Davis Street, Hurst, Reading, Berkshire RG10 0TH, UK. Tel: 01189-321402. The Journal is distributed free to BENHS members.

Typeset by Dobbie Typesetting Limited, Tavistock, Devon.
Printed in England by Henry Ling Ltd, Dorchester, Dorset.

BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY

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Cover illustration: head *Tetramesa calamagrostidis* (Hymenoptera)
photo: M. Albarrak

NOTE: The Editor invites submission of photographs for black and white reproduction on the front covers of the journal. The subject matter is open, with an emphasis on aesthetic value rather than scientific novelty. Submissions can be in the form of colour or black and white prints or colour transparencies.

BRINDALUS PORCICOLLIS (ILLIGER) (COLEOPTERA: SCARABAEIDAE: PSAMMODIINAE) IN BRITAIN

DARREN J. MANN[1] AND ROGER G. BOOTH[2]

[1]*Hope Entomological Collections, Oxford University Museum of Natural History, Parks Road, Oxford, OX1 3PW.* [2]*CABI Bioscience, Silwood Park, Buckhurst Road, Ascot, SL5 7TA.*

Abstract. *Brindalus porcicollis* (Illiger), believed extinct in Britain has been rediscovered. The occurrence, biology, ecology and conservation of this species in Britain are discussed.

INTRODUCTION

The British psammodiines are psammophilous in habitat choice, restricted in their distribution and difficult to collect. All the native species are given a rarity status in Hyman (1992), but due to lack of specific research on the species, their true distribution and conservation status is somewhat unclear. *Brindalus porcicollis* (Illiger) is one such species, which until recently was thought to be extinct in the UK. However, the recent work by the authors has clarified the known distribution and confirmed that the species is still breeding within our shores. We have summarised the known records, including both those published and those from museum collections, and report on the biology, ecology and conservation of this species.

THE HISTORY OF *BRINDALUS PORCICOLLIS* IN BRITAIN

Brindalus porcicollis was added to the British list based on a single specimen without data that was exhibited by G.R. Waterhouse at the Entomological Society of London's February meeting of 1864 (Waterhouse, 1864; Anon, 1864; Rye, 1865). The specimen was found amongst a series of *Psammodius sulcicollis* (Illiger) [= *P. asper* (Fab.)] in Kirby's British collection housed in the Entomological Society of London. The species was listed as British by Morris (1865: 18) in his catalogue and later by both Rye (1866: 256) and Crotch (1866: 6) as a doubtfully indigenous species. The species was omitted from the later list of Sharp (1871) and the *Handbook of Coleoptera* by Cox (1874).

In 1875, James J. Walker reported that a single specimen of *porcicollis* was captured in June and that some elytral fragments were found in July at Whitsand Bay, Cornwall (Walker, 1875a). Walker (1875b) tried repeatedly throughout that year to obtain further specimens, but without success until August, when he took it in small numbers. The next capture was not until 1879, when Walker returned from postings abroad and had the opportunity to visit Whitsand Bay again. His diary (J. J. Walker archive, Hope Entomological Library) of that period goes into detail of the capture: 19th May 1879 "...but owing to my having missed my way when near Fort Tregantle, it was full 3.30 pm before we descended the 'chine' before the above mentioned fort, and stood on the sandy beach of Whitsand Bay – drenched to the skin. . . . I grubbed and turned over stones (getting smothered in wet sand during the operation) and had the satisfaction of ascertaining that *Psammobius* [sic] *porcicollis* still existed in its old haunt, where I had discovered it in 1875, by capturing one specimen, and seeing the remains of another." Although Walker's captures proved *porcicollis* was present in the British Isles it was still omitted by Pascoe (1882). However, all subsequent catalogues of British Coleoptera have accepted its place in

our lists e.g. Matthews and Fowler (1883: 28); Sharp (1883: 24); Sharp and Fowler (1893: 24) and Bennett (1893: 20).

Walker's next successful excursion to Whitsand Bay was not until 4.v.1886 when he found the remains of a single specimen. However, the next published record of *porcicollis* was not until 1892 in a paper by James H. Keys, a friend of Walker, who lived in Plymouth and frequently accompanied Walker on local collecting trips. Keys visited Whitsand on two occasions during September 1891 securing some 21 specimens in total; his diary (Plymouth City Museum) gives an account of its capture: "They were all taken in a small space about a foot square, and they were 4 or 5 inches down in the sand." These finds were noted by Walker (1895: 266) as a new 'station' on the site for the species, this find was also the first instance of the species being taken from grass tussocks at the top of the cliffs as opposed to being found under stones and plants in sand at the beach head.

Walker and Keys made a further four successful trips to the site between August 1894 and August 1895 finding approximately 50 individuals. A trip made by Keys alone in March 1895 is of particular interest as his diary states "I took 4 specimens in burrows in the soil under stones fitting closely to the earth—not sand as first capture". This observation is interesting as this is the first account (in Britain at least) of this species occurring in a non-sand substrate. This fact along with the earlier observations of Keys (in Walker, *l.c.*), where the species had been noted hibernating in grass tussocks at the top of the cliff, shows the beetle's ability to survive outside the normal psammophilous niche it occupies elsewhere in Europe (e.g. Kim & Lumaret, 1981).

In Walker's (1895) summary paper on the species he states that: "At present *Psammobius* [sic] *porcicollis* appears to be restricted to a space of a few yards square in extent, about half way up the cliffs, and 30 or 40 feet above the high-water mark, where the clean sand of the beach passes into a sort of loam, the debris of the schistose rock of which the cliffs are composed." Although Walker believed the species to be "obtainable during the whole of Spring and Summer", it is clear from his own observations that the species is a Spring breeder, with emerging adults beginning to appear towards the end of July into August, as Walker noted himself the August specimens appeared mostly teneral. The closing paragraph shows an undertone of concern for the beetle's future, "so it is hoped that *Psammobius* [sic] will continue to hold its own there for many years to come".

The last historic record for *porcicollis* from this site appears to be that of April 1897; the only other published references appear to be those in the species accounts in the *British Red Data Books: 2: Insect* (Shirt, 1987: 177) and in *A Review of the Scarce and Threatened Coleoptera* (Hyman, 1992: 389). Their source for this record is not given, and neither the notebooks nor diaries of Walker or Keys bear this date of capture for *porcicollis*. Examination of most major collections that contain this species revealed a single specimen in the Dale Collection (Hope Entomological Collections, Oxford) that bears the data "Plymouth 04-97 JHK"; the locality is certainly incorrect and probably assumed from the home address of Keys. This would appear to be the only known source for this date, although the date may in fact refer to the date at which time the specimen was donated to Dale and not that of its capture. Other dubious dates include 1896, which is reported on a number of specimens in museum collections; again, this may in fact refer to the date of donation rather than that of a collection date.

It would appear as though only two people have collected *porcicollis*, as of the material so far examined in museum collections and the published papers all references have been to either J. J. Walker or J. H. Keys. The total number of

specimens of this species collected is just over 70, and these are distributed amongst various museum collections around Britain. A list of the known capture dates and number of specimens collected is given in Table 1. There are also a number of misleading localities both on data labels and in the literature (e.g. Britton, 1956: 23), these include: Plymouth; Plymouth District; Devon and Devonport, however, all authentic records of this species are from Whitsand Bay.

Fowler & Donisthorpe (1913: 271), in their *Additional Localities, Notes etc.* for Scarabaeidae, list *porcicollis* as occurring at Pyle, Glamorgan (VC 41) giving Tomlin as the author of this record. This spurious record has been perpetuated throughout the subsequent literature e.g. Joy, 1932: 246; Britton, 1956: 23; Shirt, 1986; Jessop, 1986: 18; Shirt, 1987: 177; Hyman, 1992: 389 and Fowles, 1995. However, Tomlin in his *Coleoptera of Glamorgan* (1914) does not list *porcicollis*, and in the additions to his list (Tomlin, 1933), published some nineteen years after Fowler & Donisthorpe, no mention is made of *porcicollis*. In a copy of *The Coleoptera of Glamorgan* owned by H. M. Hallett (a friend of Tomlin's and an avid Glamorgan recorder) that is annotated in his own hand, there is no indication of a record for this species for Glamorgan. Further to this, in a paper on coastal beetles, Keys (1918: 510) states: "*P. porcicollis* Tregantle, apparently the only British locality"; again, this ignores the record of Fowler & Donisthorpe (*l.c.*). In both the Tomlin and the Hallett collections housed in the National Museums and Galleries of Wales, Cardiff, the only material of *porcicollis* is that which was collected by J.J. Walker and J.H. Keys from Whitsand Bay.

The only indication as to the basis of this erroneous record, other than being first reported by Fowler & Donisthorpe (*l.c.*), is given by Hyman (1992: 389) where it is stated: "Pyle, Glamorganshire, where it was last recorded, in numbers in 1899" although the source for these data is not given. If it can be assumed that this is also the same source as that of the Fowler & Donisthorpe (*l.c.*) citation then this record can be deleted. Tomlin (1900) published an account of *Psammobius* [sic] *sulcicollis* occurring in large quantities in 1899 on the dunes at Pyle, near Candleston (= Kenfig Warren NNR) after a rainstorm saying that "They came up out of the sand by myriads, and one could have supplied all the collections in England off a few square yards". This may well be the origin of the Pyle *porcicollis* record, and may be due to some misinterpretation of the name or it may just have been copied incorrectly from this source. It is therefore our opinion that the Pyle record of *porcicollis* be deleted due to lack of voucher material or other evidence.

In the more recent literature that cover the British Scarabaeidae *porcicollis* is reported as being: "rare" Britton (1956); "not recorded for over 70 years" (Shirt, 1986; Jessop, 1986; Shirt, 1987); "possibly extinct" (Shirt, 1987; 1991: 102) and finally proclaimed "extinct" (Hyman, 1992). However, a recent and unnoticed record was published in the Military of Defence magazine; *Sanctuary* (Piercy, 1990), unfortunately, neither the locality nor the collector determiner were cited. The record was under the heading "Some new discoveries on MOD sites in 1989: Cornwall-Entomology" and understates: "(*Psammodius porcicollis*). This beetle has not been recorded since the turn of the century." The current location of the voucher specimen is unknown, as is the source of the record, and until either is forthcoming, this record is considered by the authors as doubtful.

Recent captures of *Brindalus porcicollis*

While on a family holiday in the eastern part of Cornwall in August 1999, one of us (RGB) attempted to look for *Brindalus porcicollis*, because as far as he was aware,

Table 1. Summary of the known capture dates for *Brindalus porcicollis* in Britain

Locality cited	Date	Collector	Number of specimens	Source: HEC = Hope Entomological Collections. HEL = Hope Entomological Library. PCM = Plymouth City Museum.
Unknown	?.1865	?	1	*Journal and Proceedings of the Entomological Society London*, Feb 1 1865 pp 3–4.
Tregantle Fort, Whitsand Bay, Cornwall	?.vi.1875	J. J. Walker	1	*Entomologist's Monthly Magazine* **12**: 62
Tregantle Fort, Whitsand Bay, Cornwall	?.vii.1875	J. J. Walker	Elytral fragments	*Entomologist's Monthly Magazine* **12**: 62
Tregantle Fort, Whitsand Bay, Cornwall	?.viii.1875	J. J. Walker	A small series	*Entomologist's Monthly Magazine* **12**: 108
Tregantle Fort, Whitsand Bay, Cornwall	19.v.1879	J. J. Walker	1	J. J. Walker Notebook no: 4, HEL J. J. Walker Diary April–Oct. 1879, HEL
Whitsand Bay	04.v.1886	J. J. Walker	1 (remains)	J. J. Walker Notebook no: 4, HEL
Tregantle	13.ix.1891	J. H. Keys	20	J. H. Keys Catalogue of British Coleoptera, PCM *Entomologist's Monthly Magazine* **28**: 23-24
Tregantle Fort, Whitsand Bay, Cornwall	16.ix.1891	J. H. Keys	1	J. H. Keys Catalogue of British Coleoptera, PCM *Entomologist's Monthly Magazine* **28**: 23–24
Tregantle Fort,	07.viii.1894	J. J. Walker	15 JJW	J. J. Walker Notebook no: 21, HEL
Whitsand Bay, Cornwall		J. H. Keys	1JHK	J. H. Keys Catalogue of British Coleoptera, PCM
Tregantle Fort, Whitsand Bay, Cornwall	14.03.1895	J. H. Keys	4	J. H. Keys Catalogue of British Coleoptera, PCM
Tregantle Fort,	25.03.1895	J. J. Walker	15 JJW	J. J. Walker Notebook no: 21, HEL
Whitsand Bay, Cornwall		J. H. Keys	13 JHK	J. H. Keys Catalogue of British Coleoptera, PCM
Tregantle Fort, Whitsand Bay, Cornwall	?.viii.1895	J. J. Walker	?	*Entomologist's Monthly Magazine* **31**: 266
Tregantle Fort, Whitsand Bay, Cornwall	?.iv.1897	J. H. Keys	1	Locality listed in error on label as "Plymouth" HEC, Dale Collection. Date dubious.
Cornwall	1989	?	?	No voucher is known. Record remains dubious until voucher or collector is forthcoming
Tregantle Fort, Whitsand Bay, Cornwall (SX3852)	25.viii.1999	R. G. Booth	1	Field data
Tregantle Fort, Whitsand Bay, Cornwall (SX3852)	26.viii.1999	R. G. Booth	2	Field data
Tregantle Fort, Whitsand Bay, Cornwall (SX3852)	22.ix.1999	D. J. Mann	1	Field data
Tregantle Fort, Whitsand Bay, Cornwall (SX3753)	23.ix.1999	D. J. Mann	2	Field data

the species had not been found in Britain since the end of the 19th century. A week or so before leaving for Cornwall, RGB had indicated his intentions to DJM, who, having previously captured the species in Portugal, advised that it was necessary to search for this species by digging into the damp sand around the roots of plants. Armed with this information and having noted the comments in Fowler (1890), RGB visited Whitsand Bay on 25.viii.1999. The day had started with drizzle and low cloud, but brightened for a while later. Following the track down to the beach below Fort Tregantle (National Grid Reference, SX3852), a search for suitable sites was made. At one place, a bank of sand against the base of the cliff was noted in particular, and especially a large clump of restharrow (*Ononis repens* L., Fabaceae) growing there. By digging into the sand at the base of this plant, a few beetles were found, including two *Aegialia arenaria* (Fab.) (Scarabaeidae: Aegialiinae) and several *Falagria thoracica* Stephens (Staphylinidae). After 30 minutes or so of searching, a single, rather teneral *Brindalus porcicollis* was found, soon after which the search had to be curtailed.

Returning the following day, 26.viii.1999 the search was continued at the same site. Another *Brindalus* was found close to the roots of the restharrow, and a second specimen for the day found 2–3 feet away at the roots of one of the sand-dune grasses, whereupon the search for any further specimens was discontinued. All the sand was returned to the bases of the plants in order to avoid any lasting disturbance to the rather limited available habitat.

The site was visited again on the 22–23 of September by one of us (DJM) in an attempt to ascertain the extent of available habitat for the species. Knowing the location of the finds from the previous visits by RGB, an attempt was made to locate the beetle in other areas. On arriving on the evening of the 22nd the coast to the east of the known site was surveyed for suitable habitat, this proved fruitless with some 1 km of the coast considered to be unsuitable in terms of lack of available banks of sand above the high tide mark. However, the Ordnance Survey Explorer Map (108: 1:25,000) indicates that the beach to the west of Freathy (SX396520), which was not surveyed, appears to have at least some sand above the high tide mark. It is hoped to be able to return to this area in the future to complete the survey. Returning that night to the beach below Tregantle Fort (SX384527), a search by torchlight for the species was conducted along Long Sands beach to Trethill Cliffs (SX372533). After about three hours searching, no surface-active specimens were seen, with only a small number of *Aegialia arenaria* and *Broscus cephalotes* (Linnaeus) (Carabidae) present. However, previous experience of this species in Portugal (D. J. Mann *pers. obs.*) has shown that even when present in large numbers the species is rarely seen above ground. It was estimated that approximately a 1 km stretch of beach contained a number of small patches of suitable habitat, that is, banked sand above the high tide mark with some vegetation cover.

At one of these areas with banked sand (SX384528), a single specimen was found after 30 minutes of sifting sand from under a sprawling sea rocket plant (*Cakile maritima* Scopoli, Apiaceae). A further search in this area for another 30 minutes provided no more material. On the second day, the area to the west of the capture by RGB was surveyed at Trethill Cliffs (SX379531), where sand was dug and sieved from that which was banked against the cliff, a single specimen was discovered. Time was cut short by the incoming tide so a small bag of the roughly sieved sand was then taken back for further examination. This was then placed into a tray and a single specimen was extracted by 'flotation'. A further specimen was lost due to a wave washing over the tray.

There are several areas of sand above the high tide line to the West of Trethill Cliffs that are shown on the Ordnance Survey Map (Explorer 108); these areas need

to be surveyed at suitable times in the future to ascertain the extent of the distribution of this species along this stretch of coastline.

The ecology and biology of *Brindalus porcicollis*

The biology of the Psammodiinae as a whole is poorly known and with the exception of a few species, the larvae are undescribed. However, *Brindalus porcicollis* is one of these exceptions, with larval and pupal descriptions in Kim (1978) and an ecological study based in southern France published by Kim & Lumaret (1981). Throughout its range (Europe and North Africa) *porcicollis* appears to be restricted to sandy habitats, most often coastal sand dune systems. Kim & Lumaret (*l.c.*) suggest that sand particle size and presence of suitable vegetation cover play a major role in the distribution of this species within sand dune systems, and this therefore presumably excludes areas outside the suitable parameters. In the Cornish populations specimens have been found in a soil substrate (see above), however, we presume these to have been hibernating specimens and that these microhabitats do not form part of the true breeding 'area' of the species.

British data suggest that this species is a spring breeder with adults becoming active in March, occurring through to May. The larvae pass the summer in the sand feeding on detritus, pupating *in situ*, then the adults emerge from July to August. The adults probably start hibernating from September onwards, depending on local environmental conditions. This is supported by the studies of Kim & Lumaret (*l.c.*); however, unlike the populations studied by these authors it is thought that the British population has an annual life cycle.

Kim & Lumaret (*l.c.*) in their laboratory studies state that this species is biannual, with a spring and autumn activity period. In the spring period, oviposition takes place in March and April with a maximum of twelve eggs laid per female per annum. Each stage of the life cycle is very temperature dependent with increased instar lengths at the lower end of the scale (i.e. below 20 °C). The eggs take up to fourteen days to hatch, the first two instars may take up to 50 days, with the final instar being the most variable depending on the temperature and may take up to 30 days to complete. The pre-pupal stage may also last for an extensive length of time (up to 80 days); however, the pupation period is very short and emergence occurs up to 18 days later. Adults emerging in autumn will also reproduce (depending on latitude), the length of each instar of the resulting offspring being similar to that of the spring brood; however, the larvae will pass the winter in a pre-pupal stage, which may last up to four months. Pupation occurs the following spring and adults emerge after a similar pupation period as the spring brood.

Conservation status of *Brindalus porcicollis*

Although *Brindalus porcicollis* was considered extinct by Hyman (1992: 389) with no 20th century records (the reference in Piercy, 1990, presumably being overlooked), this is now no longer the case. The status of *Brindalus porcicollis* is uncertain, but it almost certainly warrants a status of *Red Data Book* category 1, Endangered, as it would appear that it is restricted to a single locality. The locality itself, although not directly under threat, may suffer from visitor pressure to the beach area and winter storms, although since it has survived for over one hundred years at this site, it seems unlikely that this will have a major detrimental effect. However, over-zealous collecting by coleopterists may well have a detrimental effect on this beetle's future. The habitat that this beetle occupies, as far as known, is small

in area and readily accessible. While the removal of a small number of individuals for collections may not pose a direct threat (although with a very low fecundity, i.e. 12 eggs produced per individual, the loss of females from the population may have an effect), the disturbance caused through invasive–destructive searching collecting techniques will have a severe detrimental effect on the microhabitat.

The generic status of *Brindalus porcicollis*

Brindalus Landin, 1960, was established as a subgenus of *Phycochus* Broun, 1886, for a single species: *azoricus* Landin, 1960. However, this species was later synonymised by Pittino (1980) with *porcicollis* (Illiger, 1803), who then established *Brindalus* as a subgenus of *Psammodius* Fallèn, 1807, to include: *porcicollis*; *rotundipennis* Reitter, 1892; *granulicollis* Pittino, 1980 and *schatzmayri* Pittino, 1980. A further species was added to the subgenus by Pittino (1983), namely *Psammodius* (*Brindalus*) *maderae* Pittino, 1983, and all five species were keyed by Rakovič (1986: 16–17). This subgeneric placement is followed by a number of current European works such as Rakovič (1981; 1986), Baraud (1992) and Krell & Fery (1992).

However, Pittino & Mariani (1986) point out that the subgenera of *Psammodius* (namely: *Psammodius s.str*; *Brindalus*; *Leiopsammodius* Rakovič, 1981; *Granulopsammodius* Rakovič, 1981) are as distinct from each other as *Psammodius* is from the other genera of the Psammodiinae, and thus should be given generic status. This is followed in the world catalogue of Dellacasa (1988) and here.

Acknowledgements

We would like to thank Stella Brecknell, the Librarian of the Hope Library of Entomology, for access to the Walker Archives, and Dorothy Newman for help with translations and for critically reading the manuscript. Many thanks are also due to Helen Fothergill of Plymouth City Museum for access to the J. H. Keys collection and notebooks and to Howard Mendel of The Natural History Museum, London and Mike R. Wilson, Mark Pavett and Brian Levey of the National Museum and Galleries of Wales, for help during visits to their respective collections. Voucher specimens are deposited in the Hope Entomological Collections and The Natural History Museum.

References

Anon. 1864. Proceedings of Societies, Feb. 1864. Exhibitions & C. *Zoologist* 8980 (1864).

Britton, E. B. 1956. Coleoptera Scarabaeoidea. *Handbooks for the Identification of British Insects*. **5**(2): 1–29. Royal Entomological Society, London.

Baraud, J. 1992. *Coleoptères Scarabaeoidea d'Europe*. Faune de France. **78**: i–ix, 1–856.

Cox, H. E. 1874. *A Handbook of the Coleoptera or Beetles of Great Britain and Ireland*. vol. II. Janson, London.

Crotch, G. R. 1866. *Catalogue of British Coleoptera*. 2nd Edition.

Dellacasa, M. 1988. Contribution to a world-wide catalogue of Aegialiidae, Aphodiidae, Aulonocnemidae, Termitotrogidae (Coleoptera, Scarabaeoidea). *Memorie Della Società Entomologica Italiana* **66** 1987[1988]: 1–455.

Fowler, W. W. 1883. Notes on new British Coleoptera since 1871, with notices of doubtful species and of others that require to be omitted from the British List. *Entomologist's Monthly Magazine* **19**: 247–250.

Fowler, W. W. 1890. *The Coleoptera of the British Isles* **4**. Reeve, London.

Fowler, W. W. & Donisthorpe, H. St. J. K. 1913. *The Coleoptera of the British Isles*. **6** (Supplement). Reeve, London.

Fowles, A. P. 1995. A Working Checklist of the Coleoptera Recorded from Wales. Countryside Council for Wales, Bangor.

Hyman, P. S. (Revised Parsons, M.S.) 1992. UK Nature Conservation No. 3: *A review of the scarce and threatened Coleoptera of Great Britain*. part 1 Joint Nature Conservation Committee, Peterborough.

Jessop, L. 1986. Dung Beetles and Chafers Coleoptera: Scarabaeoidea (New Edition) *Handbooks for the Identification of British Insects*. **5**(2): 1–53 Royal Entomological Society, London.

Joy, N. H. 1932 *A Practical Handbook of British Beetles*. Witherby, London.

Keys, J. H. 1892. Coleoptera in the Plymouth District. *Entomologist's Monthly Magazine* **28**: 23–24.

Keys, J. H. 1918. A list of Maritime, Sub-maritime and coast-frequenting Coleoptera of South Devon and South Cornwall, with special reference to the Plymouth District. *Journal of the Marine Biological Association n.s.* **11**(4): 498–513.

Kim, J. I. 1978. *Écologie, morphologie et Taxonomie de Psammodiini (Coleoptera. Scarabaeoidea, Aphodiidae) sabulicoles du Golfe du Lion*. Thèse doct. Uni. University of Science and Technology Languedoc, Montpellier.

Kim, J. I. & Lumaret, J. P. 1981. Écologie de *Psammodius porcicollis* (Ill.) (Col., Aphodiidae), insecte sabulicole des dunes littorales du Golfe du Lion. *Annales de la Société entomologique de France* **17**(4): 449–462.

Krell, F. T. & Fery, H. 1992. Trogidae, Geotrupidae, Scarabaeidae, Lucanidae. Chapter pagination: 201–253. in Lohse, G. A. & Lucht, W. H: [Eds]. *Die Käfer Mitteleuropas*. 2 Supplementband mit Katalogteil. (Volume 13). Goecke & Evers, Krefeld.

Matthews, A. & Fowler, W. W. 1883. *Catalogue of British Coleoptera*. West, Newman & Co, London.

Morris, F. O. 1865. *A Catalogue of British Insects in all the orders*. London.

Pascoe, F. P. 1882. *The Students list of British Coleoptera with synoptic tables of the Families and Genera*. Taylor & Francis, London.

Piercy, A. 1990. What's New in Nature: Some of the new discoveries on MOD sites in 1989. *Sanctuary* **19**: 5.

Pittino, R. 1980. Revisione del genere *Psammodius* Fallèn: 4. Le specie paleartiche del sottogenere *Brindalus* Landin. *Atti Della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano* **121**(4): 337–359.

Pittino, R. & Mariani, G. 1986. A revision of the Old World species of the genus *Diastictus* Muls. and its allies (*Platytomus* Muls., *Pleurophorus* Muls., *Afrodiastictus* n. gen, *Bordatius* n. gen.) (Coleoptera, Aphodiidae, Psammodiini). *Giornale Italiano di Entomologia* 3 No. 12 1986: 1–165.

Rakovič, M. 1981. A Revision of the *Psammodius* Fallèn species from Europe, Asia and Africa. *Rozpravy Ceskoslovenske Akademie ved Rada Matematickych A Prirodnich ved* **91**(1): 3–82.

Rakovič, M. 1986. Complementary notes to my revision of Old World *Psammodius* Fallèn species (Coleoptera, Scarabaeidae, Aphodiinae). *Annotationes Zoologicae et Botanicae* **174**: 1–19.

Rye, E. C. 1865. New British Beetles, Corrections of Nomenclature, &C., noticed since the publication of the Entomologist's Annual, 1864. *Entomologist's Annual* 1865: 37–80.

Rye, E. C. 1866. *British Beetles: An Introduction to the Study of our Indigenous Coleoptera*. Reeve & Co., London.

Sharp, D. 1871. *Catalogue of British Coleoptera*. Janson, London.

Sharp, D. 1883. *Catalogue of British Coleoptera*. 2nd Edition. Janson, London.

Shirt, D. B. 1986. Newsletter of the Scarabaeoidea Recording Scheme. Biological Records Centre, Huntingdon.

Shirt, D. B. (Ed.) 1987. *British Red Data Book 2: Insects*. Nature Conservancy Council, Peterborough.

Shirt, D. B. 1991. Scarabaeoidea in Cooter, *et al. A Coleopterists Handbook*. (3rd Ed.), Amateur Entomologists' Society, London.

Tomlin, J. R. Le B. 1900. *Cardiophorus equiseti*, Herbst, in Glamorganshire. *Entomologist's Monthly Magazine* **36**: 63.
Tomlin, J. R. Le B. 1914. The Coleoptera of Glamorgan. *Transactions of the Cardiff Naturalists Society* **47**: 13–33.
Tomlin, J. R. Le B. 1933. Additions to the Coleoptera of Glamorgan. *Transactions of the Cardiff Naturalists Society* **66**: 87–102.
Walker, J. J. 1875a. Occurrence of *Psammodius porcicollis* Ill., in Cornwall. *Entomologist's Monthly Magazine* **12**: 62.
Walker, J. J. 1875b. Notes on Coleoptera in Cornwall & C. *Entomologist's Monthly Magazine* **12**: 108–109.
Walker, J. J. 1895. *Psammodius porcicollis* Ill. *Entomologist's Monthly Magazine* **31**: 266–267.
Waterhouse, G. R. 1864. Exhibitions, & C. *Journal of Proceedings of the Entomological Society of London*, February 1, 1864.

SHORT COMMUNICATION

***Micropygus vagans* Parent (Diptera: Dolichopodidae) still resident in Ireland.**—In my recent paper (1999, *British Journal of Entomology and Natural History*, **12**: 215–220) on the occurrence of this New Zealand dolichopodid in the British Isles, I cited several Irish records from the period 1971 to 1987. In September 1999, I revisited Ireland and took the opportunity to investigate the Slade of Saggart area of County Dublin where Jim O'Connor had found this fly in 1981. My visit was on 26 September and I was not expecting to find this species, as the record from here on 7 August was the latest date on which *M. vagans* had been recorded in the British Isles. The previous record of *M. vagans* from this area was from the vicinity of the stream in the valley, so I was surprised to find a single male in my catch from a track through conifer plantations on Lugg Hill (O0324), which rises above the valley to the west and is situated on the northern edge of the Dublin Mountains, providing an extensive view of the city. Unfortunately the fly was not recognised in the field so the precise location of the find was not recorded.

The main purpose of my visit was to determine accessions of Diptera in the collections of the National Museum, Dublin and I can also report a further Irish record of *M. vagans*. This was of a single female from Malahide Castle, County Dublin (O0220453) taken on the even later date of 13 October 1985 by J. P. and M. A. O'Connor. This locality is on the coast to the north of Dublin, not far from my earlier finds at Howth and provides confirmation that *M. vagans* is well established in the Dublin area. PETER J. CHANDLER, 43 Eastfield Road, Burnham, Slough, Berks SL1 7EL

BOOK NOTICE

Checklist of Lepidoptera recorded from the British Isles second edition (revised) by **D. J. Bradley**. (Technical Editors D. J. and M. J. Bradley). i + 116 p.p., A4 paperback. ISBN 0 9532508 2 2. September 2000; published privately, available from D. J. Bradley, The Glen, Frogham, Fordingbridge, Hants SP6 2HS; price, £12.50 plus £2 delivery.

1999 ANNUAL EXHIBITION
Imperial College, London SW7—27 November 1999

The following account of exhibits has been compiled by A. M. Jones (British butterflies), G. A. Collins (British Macrolepidoptera), H. E. Beaumont (British Microlepidoptera), N. M. Hall (Foreign Lepidoptera), P. J. Chandler (Diptera), P. J. Hodge (Coleoptera), A. J. A. Stewart (Hemiptera), A. J. Halstead (Hymenoptera and other orders), R. Dyke (Illustrations). The photographs for the two colour plates were taken by D. E. Wilson and the cost of printing these plates was met by a grant from the Hammond Memorial Fund.

British Butterflies

Bailey, K. E. J.—Genetic and temperature experiments during 1999. *Aglais urticae* (L.): extreme examples of the polygenic ab. *pseudoconnexa* Cabeau from selective pairings. These enhanced the expression of the aberration whilst reducing the proportion of types. Cold shock experiments on the same stock tended to suppress the expression of the gene. An attempt at combining *pseudoconnexa* and specimens with small central forewing spots (possibly another polygenic form) is under way.

Argynnis adippe (D.&S.): the results of pairing stock of U.K. origin with pure f. *cleodoxa* Ochsenheimer from Bulgaria. The F_1 produced 85% *cleodoxa* indicating that it was dominant. Cold shock experiments produced one specimen with its dark markings tending to coalesce.

Eurodryas aurinia (Rott.) ab. *atratus* Bailey: further breeding of this new aberration including specimens bred in an F_2 from pairings between male ab. *virgata* Tutt and female *atratus* showing a tendency to combine in two forms. Also exhibited were specimens of *virgata* from selective breeding experiments showing some specimens to be genetic in origin. These were compared with phenocopies induced by cold shock, the difference being apparent in the underside markings which were type in the genetic stock but transitional to ab. *sebaldus* Schultz in the cold shocked specimens.

Other specimens resulting from cold shocks included an extreme female *Argynnis paphia* (L.) ab. *nigricans* Cosmovici (also subjected to late larval photoperiod change). Various *Melitaea cinxia* (L.) aberrations, an extreme ab. *sebaldus* of *E. aurinia* and a varied series of confluent and melanic *Issoria lathonia* (L.). Two *Colias croceus* (Geoffroy) approaching ab. *pseudomas* Cockerell including a f. *helice* Hübner, and a male ab. *nigrofasciata* Verity (shortened day length during the late larval stage and prolonged cold shock), a similarly treated *helice* with uneven distribution of the black pigment.

Interesting specimens that occurred spontaneously during breeding experiments included an *M. cinxia* with homoeosis on the right hindwing, an *E. aurinia* ab. *melanoleuca* Cabeau (Plate I, Fig. 9) with strongly aberrant forewings and near normal hindwings (the exhibitor believes that this was induced by the accidental overheating of a cage of pupating larvae, by a combination of sunlight and infrared lighting), an *I. lathonia* with extreme melanic forewings (Plate I, Fig. 10) (believed to have resulted from a pupating larva getting overheated in the greenhouse).

A wild-caught *Vanessa atalanta* (L.), showing a bilateral red pigment disorder to the hindwings, Thorverton, S. Devon, ix.1999.

Booker, R. J.—An unidentified yellow *Pieridae* taken near Goodwood, W. Sussex, 25.viii.1994.

BUTLER, A.—Wild-caught specimens, the highlight being a possibly unique "gynandrous" *Lysandra bellargus* (Rott.) with apparently male blue hindwings on an otherwise female insect, Swanage, Dorset, viii.1999. (Plate I, Fig. 3). A *Polyommatus icarus* (Rott.) ab. *obsoleta* Gillmer, Silverstone, Northants, viii.1995. *Hipparchia semele* (L.) ab. *triocellata* Ragusa, and ab. *monocellata* Lempke both Portland, Dorset vii.1999.

Captive-bred specimens included *Lycaena phlaeas* (L.) ab. *oblitera* Scudda, ab. *bipunctata* Tutt and ab. *remota* Tutt from S. Yorks larvae, iv.1999, and an ab. *remota* + ab. *partimauroradiata* Leeds (Plate I, Fig. 11), from E. Sussex larvae, iv.1998. *P. icarus* a selection of obsolete specimens bred viii.1999 from a female taken at Kettering, Northants.

Temperature shock experiments included from cold shock *L. phlaeas* ab. *cuneifera* Shultz, vii.1998, *Aglais urticae* (L.) ab. *conjuncta* Neuberg vi.1997. *Argynnis paphia* (L.) two ab. *confluens* Spuler one being f. *valesina* Esper iv.1999. From heat shock *A. urticae* ab. *semiichnusoides* Pronin, ab. *nigricaria* Lambillion, ab. *lucia* Derenne and ab. *nigra* Tutt, viii.1999.

BUTTER, P.—A pathological *Maniola jurtina* (L.) with white patches on the hindwings, captured at Halden Hill, Devon, 7.viii.1999.

CALLOW, M.—*Melitaea cinxia* (L.) two specimens with reduced markings on the forewings and the hindwing borders becoming dark suffused, bred F_4 generation, vi.1999. *Ladoga camilla* (L.) extreme ab. *obliterae* Robson & Gardner with much reduced white bands, captured vii.1999. *Maniola jurtina* (L.) a bilateral gynandromorph (Plate I, Fig. 4) captured on the same day as the *L. camilla*. *Lycaena phlaeas* (L.) a male with enlarged and suffused forewing discoidal spots, captured viii.1999. *Plebejus argus* (L.) a male with obsolete spotting to the underside, captured, Dorset, vii.1998.

FENSOME, B.—A selection *Maniola jurtina* (L.) captured vii.1999 and including an impressive albino female ab. *cinerea* Cosmovici from Paxton Pits, Hunts and an extreme female ab. *anticrassipuncta* Leeds (Plate I, Fig. 8), Waresley, Beds. *Lysandra coridon* (Poda.) various aberrations from the Chiltern Hills near Dunstable viii & ix.1999 including ab. *caeca* Courv., ab. *descreta* Tutt and *obsoleta* forms. *Lycaena phlaeas* (L.) an ab. *fuscae* Robson taken at Patton, Beds, ix.1999 and a bred ab. *remota* Tutt. *Inachis io* (L.) a specimen resulting from a cold shocked pupa with the right side aberrant and the left side more or less type.

Colias croceus (Geoffroy) a bred series from Corfu including a male lacking the usual black borders to the hindwings (Plate I, Fig. 2) and several ab. *pseudomas* Cockerell.

HARMER, A. S. A selection of aberrations from the exhibitor's collection featured in his book *Variation in British Butterflies* either as photographs or paintings by A. D. A. Russwurm. These include many fine historic specimens including two extreme melanic *Boloria selene* (D. & S.), an *Argynnis adippe* (L.) ab. *bronzus* Frowhawk, and a *Lysandra coridon* (Poda.) ab. *alba-radiata* Bright & Leeds, specimens taken by the exhibitor (many a feature of past exhibitions) included a fine *Argynnis aglaja* (L.) ab. *viridiatra* Strand (Plate I, Fig. 1) captured Mendips, Somerset, 21.vii.1974.

JONES, A. M. Wild-caught specimens included *Ladoga camilla* (L.) ab. *nigrina* Weymer underside, vii.1999, *Maniola jurtina* (L.) an extreme ab. *antiparvipuncta* Leeds with pin pricks for eye spots and an ab. *subtus-albida* Silbernagel both vii.1999. *Lysandra coridon* (Pada.) a male ab. *albescens* Tutt + ab. *limbojuncta* Courv. viii.1999.

Two bred *Quercusia quercus* (L.) undersides, one ab. nov. with the ocelli reduced in size and blind and one with the forewings becoming obsolete and the hindwings ab. *latefasciata* Courv. (Plate I, Fig. 5), bred by the exhibitor's father R. Jones vi.1999.

KEMP, R.—A mixed gynandromorph of *Anthocharis cardamines* (L.) predominantly female but with male streaks on one side, taken in the exhibitor's garden at Ford Village, Bucks. at 9.00 am on 3.v.1999.

MARTIN, G.—A specimen of *Parthenus sylvia* (Cramer) taken 21.vii.1999 at Bromley by Bow, East London by P. Lipcombe.

MCCORMICK, R.—Specimens taken in Co. Clare, Ireland viii.1999, *Pieris napi* (L.) ssp. *britannica* Müller & Kautz a pair from the Burren, *Maniola jurtina* (L.) ssp. *iernes* Graves taken at Fanore sand dunes, *Hipparchia semele* (L.) ssp. *clarensis* de Lattin a pair from the Burren.

REVELS, R. C. The results of breeding from a heavily marked female *Pieris napi* (L.). The original female was taken at Patton Wood, Beds, viii.1997. The F_1 emerged iv/v.1998 and were all type, an F_2 in vi.1998 only showed a slight tendency towards heavy markings, however two males appeared to be albinos, the dark markings replaced with ginger (see *Br. J. Ent. Nat. Hist.*, **12**: 1999 Plate I, Fig. 1). An F_3 in viii.1998 (5 specimens from an albino male × type female pairing) produced some specimens with a tendency to dark markings but no albinos. Pairings from the albino stock and remaining specimens were obtained and these and diapausing pupae from the F_1 & F_2 formed the basis of the four 1999 generations. Each of these generations consisted of about 100 specimens (10–20% of all eggs were infertile and 50% of larvae died), these were mostly type with only a few slightly darker than normal, however, both summer broods (broods 2 & 3 1999) produced albinos. The late summer brood also gave 2 very heavily marked females and 2 with some markings absent. A pairing between an albino female and a type male from the same brood was obtained but no eggs were laid. Pupae from typical pairings of the stock are overwintering. *Polyommatus icarus* (Rott.): an extreme underside aberration (Plate I, Fig. 2), the only aberration to emerge when half a brood of 40 fresh pupae were subjected to cooling (+2 C). *Aphantopus hyperantus* (L.): an F_2 generation from pairings between an ab. *arete* Müller male and ab. *lanceolata* Shipp. female in July 1997. These gave specimens with slightly streaking pupils but lacking the outer rings.

Hipparchia semele (L.) an interesting exhibit showing the results of breeding the recessive ab. *holonops* Brouwer and ab. *monocellata* Lempke between 1975–1981.

STANDING, P. A.—*Melitaea cinxia* (L.) bred in 1999 from stock maintained for many years. These showed varying expression of the dark-marked underside ab. *wittei* Geest. Unfortunately the most extreme example failed to expand one wing.

STOKES, D.—An interesting series of *Argynnis paphia* (L.) the results of temperature experiments. These included a male ab. *nigricans* Cosmovici and several extreme *confluens*/*ocellata* forms of both sexes, some with very striking undersides (Plate I, Fig. 7). A specimen of *Coenonympha pamphilus* (L.) captured in Beds., in 1993 and a *Lycaena phlaeas* (L.) bred from Northants, stock 1998 both showing homoeosis.

TEBBUTT, P.—Various melanic nymphalid butterflies the results of temperature experiments on freshly formed pupae. *Aglais urticae* (L.) ab. *semiichnusoides* Pronin, ab. *nigrocaria* Lambillion, ab. *velata* Turati and two transitional to *nigrocaria*. *Polygonia c-album* (L.) ab. *obscura* Closs., and ab. *sagitta-album* Frohawk. *Boloria selene* (D. & S.), two with melanic hindwings. *Ladoga camilla* (L.) ab. *obliterae* Robson & Gardner.

Thecla betulae (L.), four underside aberrations (Plate I, Fig. 6) induced by long cold shock to the pupae and a pair of uppersides, a male ab. *spinosea* Gerhard and a female ab. *restricta* Tutt.

A short series of *Lysandra coridon* (Poda.) from various localities including *obsoleta* and *caeca* forms and a fine male ab. *antidigitata* B. & L.

A second-brood specimen of *Erynnis tages* (L.) from Northants.

YARNOLD, J.—Photographs of a male *Danaus plexippus* (L.) taken on 30.ix.1999 on three separate occasions on the same day at St. Dellan, in the parish of St. Buryan, Cornwall. The butterfly was first observed in the gardens just above the low sea cliff at 11 am but not photographed until midday as it rested on ivy, and again soon after on flowers and then at 3 pm on buddleia. Other sightings were made on the 1 & 2.x. Observations showed that the butterfly visited the garden for roughly half hour periods and would then fly off over the trees and up the hillside.

Melitaea cinxia, photographs taken at Hordle Cliff, Hampshire on the 1, 7 & 14.vi.1999.

A very interesting photograph of an extreme melanic male aberration of *Lasiommata megera* (L.) (appearing like an ab. *saturatior* Crumbrugge of *Pararge aegeria* (L.)) taken on the afternoon of 2.x.1999 as it patrolled a large area of flower beds in gardens at St. Dellan, Cornwall. It was observed again on the morning and afternoon of 3.x when it showed its underside to be normal. Unfortunately no further photographs were possible and the specimen was not retained.

BRITISH MACROLEPIDOPTERA

Although 1999 was probably an even poorer year than 1998, more exhibits were shown, but then more exhibitors relied on material from earlier years. Immigrant Lepidoptera were generally scarce, but several examples of *Macdunnoughia confusa* (Steph.) and *Earias insulana* (Boisd.) were shown as well as reared examples of *Eublemma ostrina* (Hb.) from the many larvae found on the coast of Devon and Dorset. Amongst the resident species *Heterogenea asella* (D. & S.) had a good year; being seen in numbers in Kent, in Hampshire, and in Devon for the first time in well over 90 years. Exhibits containing examples of Channel Islands Lepidoptera are included here, although not part of the British fauna, rather than in Foreign Lepidoptera.

BAILEY, K. E. J.—*Heliothis nubigera* (H.-S.), Thorverton, S. Devon, i.1999. *Hyles livornica* (Esp.), reared from a larva on antirrhinum at Farnham, Surrey, vi.1999. *Agrius convolvuli* (L.), found at rest, Thorverton, S. Devon ix.1997. *Euplagia quadripunctaria* (Poda), aberration, Exeter, S. Devon, viii.1991 (D. Stadling).

BAILEY, M.—An exhibit showing the comparative totals, flight times and wing-span of *Mesapamea secalis* (L.) and *M. didyma* (Esp.) at Timsbury, N. Soms. in 1998. From a sample of just over 800, *didyma* comprised 10% of the catch, appeared slightly later, and was marginally smaller.

BAKER, P. J.—An exhibit showing melanism in the British Geometridae, including examples of: *Idaea aversata* (L.), Thorpe, Surrey, 24.vii.1991; *Peribatodes rhomboidaria* (D. & S.), Gussetts Wood, Bucks., 16.vii.1974; *Odontopera bidentata* (Cl.), Pinner, Middx., 18.v.1964; and *Cabera exanthemata* (Scop.), Studland, Dorset, 6.viii.1976.

BROOKER, R. J. & MASTERS, I. D.—Migrant Lepidoptera from previous years: *Cryphia algae* (Fab.), Middleton-on-Sea, W. Sussex, 5.vii.1997 and 6.viii.1997; *Drepana curvatula* (Borkh.), Middleton-on-Sea, W. Sussex, 30.vii.1993.

BUTCHER, A. G. J.—*Cyclophora annulata* (Fab.), melanic forms appearing as a result of rearing several broods from a typical female from Sidney Wood, Surrey, 20.vi.1998. *Crocallis elinguaria* (L.) ab. *fusca* Reutti, Grain, W. Kent, 1.vii.1999; *Semiaspilates ochrearia* (Rossi), Grain, W. Kent, 5.ix.1999, heavily banded aberration; *Idaea aversata* (L.), bred from a very dark female, Gillingham, E. Kent, vii.1997. *Orthosia miniosa* (D. & S.), Dungeness, E. Kent, 3.iv.1999, presumed

migrant. *Miltochrista miniata* (Forst.) and *Perizoma bifaciata* (Haw.), Hamstreet, E. Kent, 8.x.1999, probable second broods.

BUTTER, P. Seven species of moth recorded as second broods in Devon in 1999: *Idaea dimidiata* (Hufn.); *Camptogramma bilineata* (L.); *Colostygia pectinataria* (Knoch); *Apeira syringaria* (L.); *Ourapteryx sambucaria* (L.); *Spilosoma luteum* (Hufn.); and *Mythimna impura* (Hb.). *Schrankia taenialis* (Hb.) and *Schrankia costaestrigalis* (Steph), the latter from Devon. *Cyclophora porata* (L.), Ashclyst Forest, S. Devon, 7.viii.1999, two colour forms.

CLANCY, S.—Moths from E. Kent: *Thera cupressata* (Geyer), Dungeness, 25.x.1999, new to Kent; *Nola aerugula* (Hb.), New Romney, 4.vii.1999, and Lydd, 5.vii.1999; *Cerastis leucographa* (D. & S.), Lydd, 4.iv.1999, probable migrant, first Kent record since 1912; *Earis insulana* (Boid.), Dungeness, 11.ix.1999, new to Kent; *Trichoplusia ni* (Hb.), New Romney, 9.viii.1999; *Pechipogo plumigeralis* (Hb.), Greatstone, 20.vii.1999; *Ourapteryx sambucaria* (L.), Lydd, 29.ix.1997, second brood example with extensive dark suffusion [a similar specimen is figured *Proc. Trans B.E.N.H.S.* **18**: plate 2]; *Tholera cespitis* (D. & S.), Dungeness, 10.ix.1999, aberration.

CLARKE, J. Lepidoptera reared or taken in 1999: *Sabra harpagula* (Esp.), Tintern, Mon., 1.vii.1999; *Heliophobus reticulata hibernica* Cock., bred from a female from Portland, Dorset, 20.vi.1998; *Conistra rubiginea* (D. & S.), bred from a female from Lingfield, Surrey, 31.iii.1999; *Schrankia taenialis* (Hb.), Longrope Wood, E. Kent, 19.vi.1999, and Tintern, Mon., 1.vii.1999; *Cossus cossus* (L.), female found dead, Charmouth, Dorset, 18.vii.1999; *Cosmia diffinis* (L.), 31.vii.1999, Hunts.; *Rheumaptera hastata nigrescens* (Prout), near Spean Bridge, Westerness, June 1999, flying amongst birch; *Hemaris tityus* (L.), near Spean Bridge, Westerness, 9.vi.1999, at bluebell flowers; *Heterogenea asella* (D. & S.), Longrope Wood, E. Kent, 29.vi.1999 three seen, 7.vii.1999 20 seen; *Chortodes morrisii morrisii* (Dale), Charmouth, Dorset, vii.1999; *Entephria flavicinctata ruficinctata* (Guenée), reared from larvae, Ben Lawers, Mid Perth, vi.1999; *Eupithecia egenaria* (H.-S.), Tintern, Mon., 27.v.1999, seen abundantly; *Zygaena lonicerae jocelynae* Tremewan, reared from cocoons from Talisker Bay, Skye, N. Ebudes, vi.1999; *Opisthograptis luteolata* (L.), Rye, E. Sussex, 29.viii.1999, near ab. *albescens* Cock.; *Melanthia procellata* (D. & S.), Slindon, W. Sussex, 19.vi.1999, ab. *extrema* Schaw (Plate 2, Fig. 1); *Lomaspilis marginata* (L.), Glen Loy, Westerness, 7.vi.1999, near ab pollutaria Hüton. A series of *Gnophos* obscurata (D. & S.) showing local forms from different soils in southern England.

COOK, R. R. -*Cosmia affinis* (L.) and *C. diffinis* (L.), reared from larvae from Cambridgeshire, v.1998. *Hecatera dysodea* (D. & S.), reared from larvae from Swanscombe, Gravesend and Northfleet, W. Kent, on 26.vii.1998. *Entephria flavicinctata flavicinctata* (Hb.), reared from larvae from Grassington, Mid-west Yorks, 16.v.1999. *Eublemma ostrina* (Hb.), reared from heads of *Carlina vulgaris* carline thistle, Portland, Dorset, 19.viii.1999.

DOBSON, A. H.—*Heterogenea asella* (D. & S.) and *Meganola strigula* (D. & S.), Frame Wood, S. Hants, 3.vii.1999. *Rhodometra sacraria* (L.), Greywell, N. Hants, 22.x.1999. *Aleucis distinctata* (H.-S.), Hook, N. Hants, 24.iii.1977, new to VC12 (P. Boswell). *Angerona prunaria* (L.), Morgaston Wood, N. Hants, 11.vi.1999, aberration. *Cerastis rubricosa* (D. & S.), Bramley Frith Wood, N. Hants, 17.iii.1999, resembling Scottish form. *Agrochola haematidea* (Dup.), 8.x.1999, from a new site in the New Forest. *Euphyia biangulata* (Haw.), Starcross, S. Devon, 12.ix.1999, second brood.

ELLIOTT, B.—*Perizoma blandiata* (D. & S.), reared from larvae found on Yell, Zetland, viii.1997, probably referable to ssp. *perfasciata* (Prout) usually found on the Hebrides.

HARMAN, T. W.—A specimen of *Schinia scutosa* (D. & S.), taken at Kingsgate, Thanet, E. Kent, 7.vii.1999 by Francis Solly.

HAYWARD, R.—Moths taken in 1999: *Hecatera dysodea* (D. & S.), Northfleet and Swanscombe, W. Kent, a pair reared from wild larvae found in 1998; Gravesend, W. Kent, 14.vii.1999, at actinic light, and reared from larvae found viii.1999; *Hypena obsitalis* (Hb.), Torquay, S. Devon, 7.ix.1999. New species from a Slough, Bucks., garden: *Eupithecia subumbrata* (D. & S.), 16.vi.1999; *Eupithecia indigata* (Hb.), 2.v.1999; *Ennomos quercinaria* (Hufn.), 1.viii.1999; *Lithophane hepatica* (Cl.), 30.iii.1999; *Apamea sublustris* (Esp.), 16.vi.1999; *Nonagria typhae* (Thunb.), 1.viii.1999.

HECKFORD, R. J.—*Eublemma ostrina* (Hb.), Strete Gate, Slapton, S. Devon, reared from larvae in *Carlina vulgaris* carline thistle, 2.vii.1999.

HENWOOD, B.—From Devon: A photograph of a larva of *Helicoverpa armigera* (Hb.), Berry Head (SX9456, VC3) vi.1999 found feeding on the seeds of *Rhinanthus minor* yellow rattle; *Triphosa dubitata* (L.), Berry Head, 31.vii.1999, presumed immigrant; *Heterogenea asella* (D. & S.), woodlands near Great Torrington (SS5217, VC4) 26.vi.1999 (W. Deakins); *Eublemma ostrina* (Hb.), Strete Gate Beach, Slapton (SX8345, VC3) 24.vii.1999, larvae in heads of *Carlina vulgaris* carline thistle from which the adults shown were reared.

JENKINS, A.—*Herminia tarsicrinalis* (Knoch), bred from a female from Thorpeness, E. Suff. *Thalpophila matura* (Hufn.) and *Luperina nickerlii knilli* Boursin, from the Dingle, N. Kerry. *Diaphora mendica* (Cl.) f. *rustica* Hb., a second generation bred from a female from the Burren, Clare. *Synanthedon myopaeformis* (Borkh.), reared from larvae from Sutton, Surrey.

KNILL-JONES, S. A.—Moths from the Isle of Wight. Freshwater: *Dryobota labecula* (Esp.), 22.xi.1999, second British record (Plate 2, Fig. 3); *Colostygia multistrigaria* (Haw.), 28.iii.1999; *Idaea aversata* (L.), 16.vii.1999, orange-banded variety; *Eupithecia indigata* (Hb.), 28.iv.1999; *Agrius convolvuli* (L.), 6.ix.1999; *Schrankia costaestrigalis* (Steph.), 15.ix.1999; *Nycteola revayana* (Scop.), 11.vii.1999; *Leucochlaena oditis* (Hb.), 11.ix.1999; *Mythimna favicolor* (Barr.), 7.ix.1999; *Orthonama obstipata* (Fab.), 24.ix and 2.xi.1999; *Plusia festucae* (L.), 10.ix.1999; *Trigonophora flammea* (Esp.), 26.x.1999; *Agrotis exclamationis* (L.), 20.vi.1999, melanic; *Parastichtis ypsillon* (D. & S.), 10.vii.1999; *Apamea scolopacina* (Esp.), 13.vii.1999; *Craniophora ligustri* (D. & S.), 16.vii.1999. From other sites: *Eupithecia millefoliata* (Rössler), St Helens and Cranmore, reared from 1998 larvae; *Chloroclystis chloerata* (Mab.), Knighton Down and Freshwater, reared from 1999 larvae; *Eupithecia tripunctaria* (H.-S.), Firestone Copse, reared from 1998 larvae; *Nola strigula* (D. & S.), Parkhurst Forest, 8-12.vii.1999; *Atolmis rubricollis* (L.), Parkhurst Forest, 8.vii.1999; *Deileptenia ribeata* (Cl.), Parkhurst Forest, 12.vii.1999. *Odontopera bidentata* (Cl.), extreme aberration reared from a 1954 Boston, Lincs., larva (Plate 2, Fig. 4)

MARSHALL, L. *Selidosema brunnearia scandinavaria* (Stdgr.), Browndown Ranges, Gosport, S. Hants., 16.viii.1999; *Trisateles emortualis* (D. & S.), Grange Copse, Gosport, S. Hants., 8.vii.1999, new to VC11.

MARTIN, G. A selection of Lepidoptera taken in urban habitats: *Hyles gallii* (Rott.), Broadstairs, E. Kent, 14.viii.1999; *Euplagia quadripunctaria* (Poda), Plymouth, S. Devon, 10.viii.1999; *Bena bicolorana* (Fuess.), Plaistow, S. Essex, 24.vii.1999; *Paradrina clavipalpis* (Scop.), Elephant & Castle, Surrey, ii.1999, a larva found spinning up on a cardigan inside a wardrobe, possibly originating from a nearby window box.

MCCORMICK, R. F. Moths recorded in Devon. Examples shown were mostly substitute specimens, but vouchers exist for all species. *Heterogenea asella* (D. & S.),

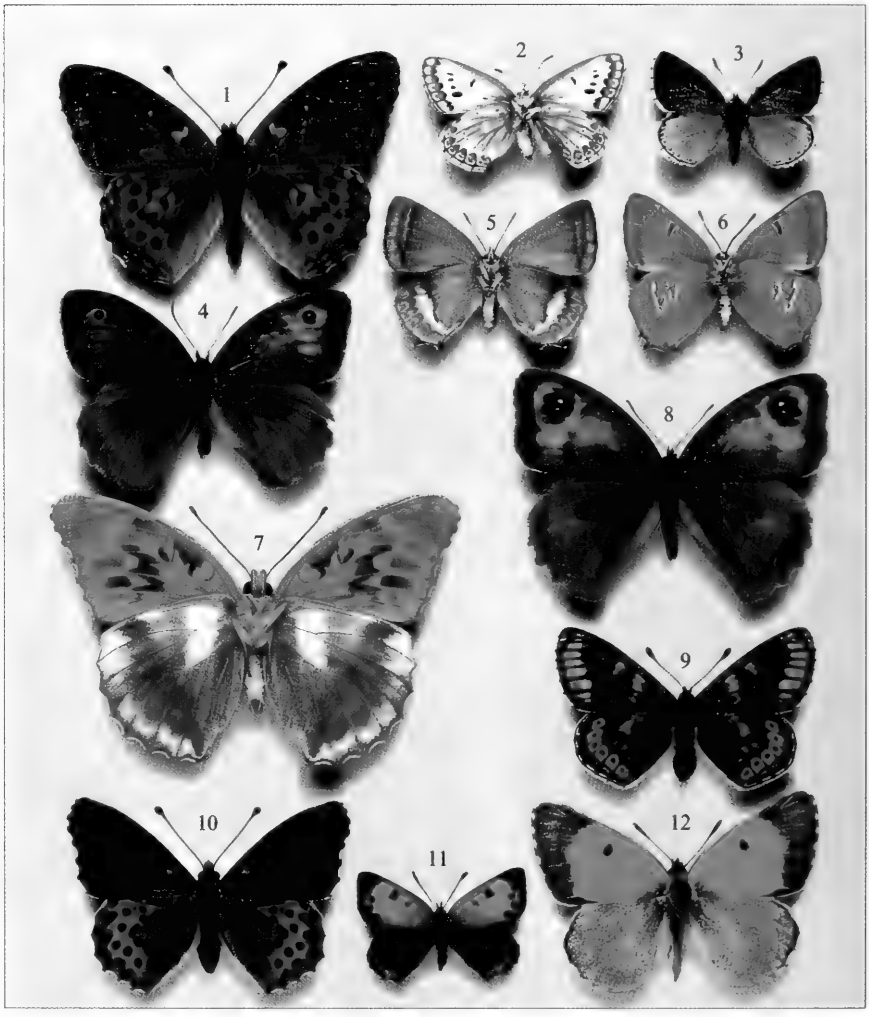

PLATE 1 ANNUAL EXHIBITION 1999

1: *Argynnis aglaja* ab. *viridiatra*, Mendips, Somerset, 1974, A.S. Harmer. 2: *Polyommatus icarus* ab. bred, 1999, R.C. Revels. 3: *Lysandra bellargus*, Swanage, Dorset, 1999, A. Butler. 4: *Maniola jurtina*, bilateral gynandromorph, captured 1999, M. Callow. 5: *Quercusia quercus* ab. *latefasciata* bred ex Surrey, 1999. R. Jones. 6: *Thecla betulae* male ab. bred. temperature shock, 1999, P. Tebbutt. 7: *Argynnis paphia* ab. *confluens*, temperature shock, 1999, D. Stokes. 8: *Maniola jurtina* ab. *anticrassipuncta*, Waresley, Beds, 1999, B. Fensome. 9: *Eurodryas aurinia* ab. *melanoleuca*, bred 1999, accidental heatshock, K.E.J. Bailey. 10: *Issoria lathonia*, bred, 1999, K.E.J. Bailey. 11. *Lycaena phlaeas* ab. *remota*, bred ex E. Sussex, 1998, A. Butler. 12: *Colias croceus*, bred ex Corfu, B. Fensome.

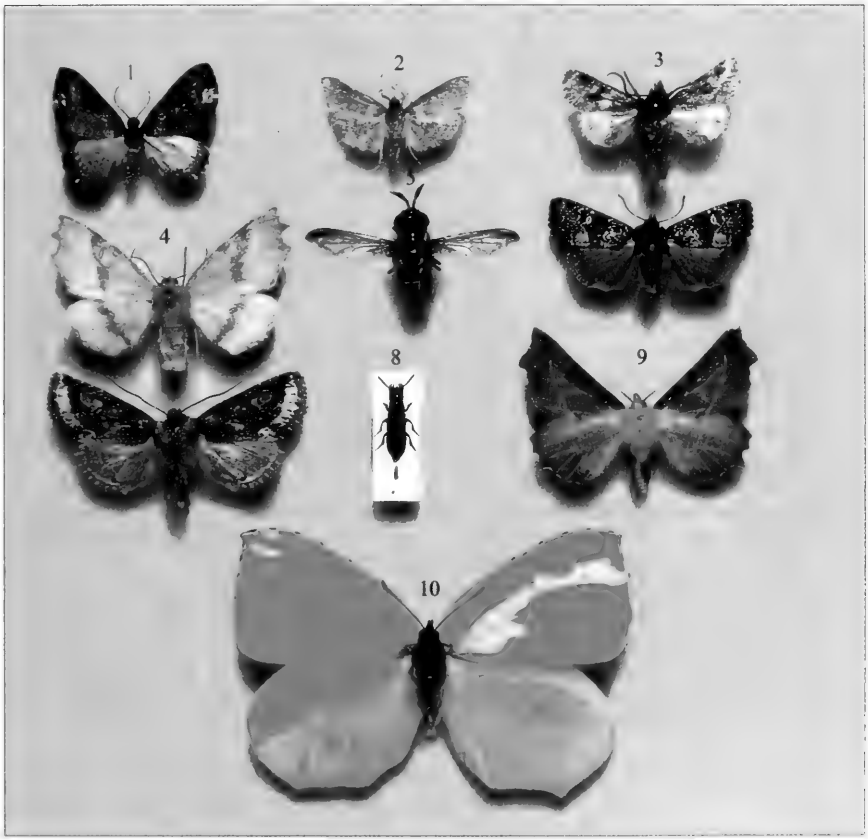

PLATE 2 ANNUAL EXHIBITION 1999

1: *Melanthia procellata* ab. *extrema*, Slindon, W. Sussex, 1999, J. Clarke. 2: *Herpetogramma licarsisalis*, Freshwater, Isle of Wight, November 1998, S. Knill-Jones. 3: *Dryobota labecula*, Freshwater, Isle of Wight, 1999, S. Knill-Jones. 4: *Odontopera bidentata* ab., Boston, Lincs, 1954, S. Knill-Jones. 5: *Callicera spinolae*, Royston, Herts, 1999, A.J. Halstead. 6: *Mesapamea secalis* ab. *lilacina*, Dymchurch, E. Kent, J. Owen. 7: *Allophyes oxyacanthae* ab. Densole, Kent, 1999, T. Rouse. 8: *Philonthus spinipes*, Guestling, Sussex, P.J. Hodge. 9: *Ennomos alniaria*, melanic, Leckford, Hants, 1999, T. Rouse. 10: *Gonepteryx cleopatra*, gynandromorph, ex Greece, 1998, N. South exhib. L. Winokur.

a second specimen from Great Torrington, VC4 [see Henwood]; *Idaea degeneraria* (Hb.), Slapton, VC3, 11.ix.1999, presumed migrant; *Discoloxia blomeri* (Curt.), Buckfastleigh, VC3, 16.vii.1999; *Furcula bicuspis* (Borkh.), Buckfastleigh, VC3, 22.v.1999, recorded from nineteen sites since 1980; *Thumatha senex* (Hb.), Newton Abbot, VC3, 9.vii.1999; *Cerastis leucographa* (D. & S.), Great Torrington, VC4, 8.iv.1999; *Lacanobia suasa* (D. & S.), Newton Abbot, VC3, 9.vii.1999; *Eublemma ostrina* (Hb.), Hopes Nose, Torquay, VC3, 12.vi.1999. *Jodia croceago* (D. & S.), a battered specimen was found in a spider's web near to Newton Abbot, VC3, 8.x.1999, but not retained. Moths from Ireland including: *Aspitates gilvaria burrenensis* Cock.; *Aporophyla lueneburgensis* (Freyer); *Luperina nickerlii knilli* Bours.; *Calamia tridens occidentalis* Cock.; and *Celaena haworthii* (Curt.).

McNAMARA, D.—*Callimorpha dominula* (L.), wild-caught examples of ab. *flavomarginata* and ab. *lutescens*, and bred examples of *dominula*, f. *medionigra* and f. *bimacula*, together with a brief description of their genetics.

NASH, S.—Moths from Fernham, Berks.: *Rhodometra sacraria* (L.), 25.viii-6.ix.1999 (14); *Agrius convolvuli* (L.), 11 and 19.ix.1999; *Orthosia miniosa* (D. & S.), 3.iv.1999, thought to be migrant; *Polyploca ridens* (Fab.), 27.iv.1999; and *Colostygia multistrigaria* (Haw.), 30.iii.1999. From Durlston Country Park, Dorset: *Thera cupressata* (Geyer), 14.xii.1998 (2) and 18.vi.1999; *Catarhoe rubidata* (D. & S.), 18.vi.1999; *Mythimna albipuncta* (D. & S.), 27.v.1999 (2) and 3.ix.1999 (2); *Mythimna unipuncta* (Haw.), 14.xii.1998; and *Conistra rubiginea* (D. & S.), 4.iv.1999. From Savernake Forest, N. Wilts: *Eilema sororcula* (Hufn.), 27.v.1999. Aberrations taken during the year: *Hepialus lupulinus* (L.), Fernham, Berks., 27.v.1999; *Cosmia trapezina* (L.), Fernham, Berks., 4.viii.1999, a plain form; *Zanclognatha tarsipennalis* (Treits.), Fernham, Berks., 29.vi.1999, a fuscous form; *Biston strataria* (Hufn.), Savernake Forest, N. Wilts., 31.iii.1999, melanic.

OWEN, J.—Moths from Dymchurch, E. Kent: *Deltote bankiana* (Fab.), 4.vii.1999; *Pelosia muscerda* (Hufn.), 4.viii.1999; *Tyta luctuosa* (D. & S.), 10.vii.1999; *Mesapamea secalis* (L.) ab. *lilacina* Warren (det. M. Honey) (Plate 2, Fig. 6).

PARSONS, M. S.—*Eublemma ostrina* (Hb.), Cheyne Weare, Portland, Dorset, reared from larvae and pupae in *Carlina vulgaris* carline thistle, 3.viii.1999. *Hypena obsitalis* (Hb.), Portland, Dorset, 27.x.1999. *Chlorissa viridata* (L.), Winfrith Heath, Dorset, 9.vi.1999.

PARSONS, M. S. & GREEN, D. G. –On behalf of Butterfly Conservation. A display illustrating aspects of work carried out as part of the Action for Threatened Moths Project. Butterfly Conservation has been appointed as the Lead Partner for the government's Biodiversity Action Plan for the majority of moth species. A three year project was started in May 1999, funded by English Nature and Butterfly Conservation, to oversee the implementation of these Action Plans. Moths featured in the display included: *Catocala promissa* (D. & S.), *Catocala sponsa* (L.), *Dicycla oo* (L.), *Moma alpium* (Osbeck), *Hadena albimacula* (Borkh.), *Calophasia lunula* (Hufn.), *Shargacucullia lychnitis* (Ramb.), and *Hypena rostralis* (L.).

PEET, T. N. D.—A specimen of *Luperina dumerilii* (Dup.), Icart Point, Guernsey, 1.ix.1999, new to the island, and three examples of *L. testacea* (D. & S.) for comparison.

PHILLIPS, J. W.—From Scotland, iv.1999: Aviemore, Elgin, *Orthosia incerta* (Hufn.), *Brachionycha nubeculosa* (Esp.), *Lycia hirtaria* (Cl.); Struan, Mid Perth, *Lycia lapponaria scotica* (Harr.). From Ireland: *Eupithecia venosata plumbea* Huggins, Doolin Point, Clare, reared from larvae found on *Silene maritima* sea campion, 7.vi.1997. A short series of *Trichopteryx polycommata* (D. & S.) bred from a female from Findon, W. Sussex found in 1998. Migrants: *Cryphia algae* (Fabr.),

Northney, Hayling Island, S. Hants., 31.vii.1999; *Macdunnoughia confusa* (Steph.), Northney, Hayling Island, S. Hants., 25.ix.1999 (P. Dunnell).

PICKLES, A. J.—*Hylaea fasciaria* (L.) ab. *grisearia* Fuchs, Lymington, S. Hants., 5.vii.1999. *Chilodes maritimus* (Tauscher), Lymington Marshes, S. Hants., examples of ab. *bipunctata* Haw., ab. *nigristriata* Stdgr., and ab. *bipunctata* + *nigricostata* Stdgr.

RIVERS, C.—*Laothoe populi* (L.), a bilateral gynandromorph taken at Cumnor Hill, Oxon., 16.vii.1999, by the exhibitor's grandson.

ROUSE, T.—*Allophyes oxyacanthae* (L.), Densole, E. Kent, 27.x.1999, pale specimen (Plate 2, Fig. 7). *Euproctis similis* (Fuess.), Folkestone Warren, E. Kent, 29.x.1999, second brood. *Aspitates gilvaria* (D. & S.), Dover, E. Kent, 20.viii.1999, lacking dark forewing stripe. *Ennomos alniaria* (L.), Leckford, N. Hants., 25.vii.1999, melanic (Plate 2, Fig. 9). Migrants from E. Kent: *Rhodometra sacraria* (L.), Folkestone Warren; *Agrius convolvuli* (L.), examples bred from wild female, Densole, 17.ix.1999; *Orthosia miniosa* (D. & S.), Densole, 2.iv.1999.

SCANES, J. T. & MIDDLETON, H. G.—Moths from Scotland taken 7–14.viii.1999. From the Spey Valley, Easterness: *Eugnorisma depuncta* (L.); *Enargia paleacea* (Esp.); *Protolampra sobrina* (Dup.); *Diarsia dahlii* (Hb.); *Stilbia anomala* (Haw.); *Carsia sororiata anglica* Prout; *Thera juniperata scotica* (White); and *Chloroclysta citrata citrata* (L.). From Findhorn, Elgin: *Euxoa cursoria* (Hufn.).

SIMS, I.—*Macdunnoughia confusa* (Steph.), Staines, Middx., 9.x.1999, new to VC21 (J. Muggleton). *Autographa gamma* (L.), and a parasite, *Pimpla turionellae* (L.) (Hym.: Ichneumonidae), reared from a larva of this species, Poole, Dorset, 25.vii.1996. Aberrations including: *Alcis repandata* (L.), Homefield Wood, Medmenham, Bucks, 10.vi.1995; *Craniophora ligustri* (D. & S.), Homefield Wood, Medmenham, Bucks, 7.vii.1995; and *Lymantria monacha* (L.), Ashley Hill Forest, Berks..

SIMSON, E. C. L.—An exhibit showing pairs of fourteen species of Lepidoptera with wingless females.

STERLING, P. H.—Moths recorded by members of the Dorset Moth Recording Network: *Hadena luteago barrettii* (Doubl.), Grove, Portland, 26.vi.1999, new to VC9 (D. Walbridge); *Earis insulana* (Boisd.), Portland Bird Observatory, 25.viii.1999, new to VC9 (M. Cade); *Xestia c-nigrum* (L.), Puddletown, 13.viii.1999, an extreme aberration (H. Wood Homer).

TREMEWAN, W. G.—A dark suffused aberration of *Lymantria monacha* (L.), Playing Place, W. Corn., 10.viii.1999.

WARNE, B.—Moths from the Isle of Wight: *Hypena rostralis* (L.), reared from larvae beaten from *Humulus lupulus* hop; *Thera cupressata* (Geyer), Binstead, 18.x.1999, with ten more up to 13.xi.1999; *Hadena compta* (D. & S.), 16.v.1998, new to VC10; *Rhodometra sacraria* (L.), 12.viii.1999; *Cyclophora puppillaria* (Hb.), 19.ix.1999.

WEDD, D. Moths from Henley-on-Thames, Oxon.: *Cepphis advenaria* (Hb.), a series bred from a female taken v.1998 and fed on birch; *Ptilodon cucullina* ([D. & S.]), second-brood example; *Archanara sparganii* (Esp.), 27.viii.1999; *Scopula immutata* (L.), 20.vii.1999; *Catarhoe cuculata* (Hufn.), 4.vii.1999. From Inch, N. Kerry, viii.1999: *Mesoligia furuncula* (D. & S.), an ochreous form; *Celaena haworthii* (Curt.), a large indistinctly-marked form; *Luperina nickerlii knilli* Bours., 24.viii.1999. From Anglesey: *Luperina nickerlii gueneei* Doubl., 27.viii.1999. From E. Norf.: *Eilema pygmaeola pygmaeola* (Doubl.) and *Pelosia obtusa* (H.-S.), Horsey Dunes, vii.1999, flying together in dune slack. From the Channel Islands, 1998–99: *Hadena luteago barrettii* (Doubl.), distinctive form; *Mythimna putrescens* (Hb.), Icart Bay, Guernsey; *Idaea rusticata atrosignaria* Lempke, one of the commonest moths;

Thera cupressata (Geyer), Achirondel, Jersey, v.1999; *Crocallis dardoinaria* (Donz.), Petit Bot, Guernsey, 3.viii.1999, third Channel Islands record; *Agrotis crassa* (Hb.), Guernsey, viii.1999; *Polyphaenis sericata* (Esp.), Guernsey, viii.1999; *Hyles euphorbiae* (L.), L'Eree, Guernsey, 6.viii.1999; and *Scopula emutaria* (Hb.) and *Eupithecia lariciata* (Freyer), Achirondel, Jersey, v.1999, both new to Jersey.

WOOLDRIDGE, D. B.—*Trigonophora flammea* (Esp.), Freshwater, Isle of Wight, 28.x.1999.

YOUNG, D.—Moths taken this year. From the Scottish Highlands, early April: *Lycia lapponaria scotica* (Harr.); *Brachionycha nubeculosa* (Esp.); *Achlya flavicornis scotica* (Tutt); *Orthosia gothica* (L.); *Orthosia incerta* (Hufn.); and *Trichopteryx carpinata* (Borkh.). From Tilshead, S. Wilts: *Bembecia ichneumoniformis* (D. & S.), swept by day. From Surrey: *Pechipogo strigilata* (L.), Sidney Wood.

BRITISH MICROLEPIDOPTERA

[NOMENCLATURE AND CLASSIFICATION FOLLOWS THE CHECKLIST OF BRADLEY 1998]

BEAUMONT, H. E.—*Morophaga choragella* (D. & S.), Anston Stones Wood, South Yorks. (VC63), 16.vii.1999, at light. (The first Yorkshire record). *Coleophora caespititiella* Zell., Skipwith Common, Selby, East Yorks. (VC61), 7.iv.1999, larval cases in seedheads of *Eriophorum*, emerged 10.v.1999. (The first VC61 record). *Elachista subocellea* (Steph.), Maltby Far Common, South Yorks. (VC63), 2.vii.1999, at light. (The first VC63 record). *Sorhagenia lophyrella* (Dougl.) Anston Stones Wood, South Yorks. (VC63), 16.vii.1999, at light. (The first Yorkshire record of a moth that does not appear to have been recorded north of East Anglia). *Epiphyas postvittana* (Walk.), specimens from several localities in the south of VC63 where this spreading species has become quite widespread. *Apotomis lineana* (D. & S.), Misson, Notts. (VC56), 17.vii.1999, at light. (The first Notts. record). *Eudemis profundana* (D. & S.), Bowden Housteads Wood, Sheffield, South Yorks. (VC63), 23.vii.1999, several at light. (The first VC63 record and the first from Yorkshire since the nineteenth century). *Cydia fagiglandana* (Zell.), specimens from several South Yorkshire woods (VC63), where it has been recorded quite commonly during 1999; the only previous confirmed Yorkshire record was from near Rotherham in 1996. *Cydia amplana* (Hübn.), Spurn, East Yorks. (VC61), 3.viii.1999, at light (leg. B. R. Spence). (The first Yorkshire record of a moth which has otherwise only been recorded from the south coast of England). *Schreckensteinia festaliella* (Hübn.), Askham Bog, York (VC64), 10.iv.1999. (The first VC64 record). *Platytes alpinella* (Hübn.), West Melton, South Yorks. (VC63), 1.viii.1999. An uncommon moth inland in Yorkshire. *Endotricha flammealis* (D. & S.), Misson, Notts. (VC56), 17.vii.1999, at light. (The first Notts. record). *Pima boisduvaliella* (Guen.), Spurn, East Yorks. (VC61), 31.vii.1999 (leg. B. R. Spence). (The first Yorkshire record).

BLAND, K. P.—*Stigmella aeneofasciella* (H.-S.), Fealar, Perths. (VC98), 23.ix.1998, linear/blotch mine on *Fragaria vesca*, emerged 30.v.1999. *Yponomeuta padella* (L.), South Melville, Midlothian (VC83), 17.vi.1999, larvae, emerged 30.vi.1999. Usually recorded only occasionally in Scotland but several localities had defoliated hedges in 1999, no parasites were reared from over fifty larvae. *Philedone gerningana* (D. & S.), Lunkard, Glen Doll, Angus (VC90), 27.vii.1999. (New to Angus). Interesting species from Isle of Arran (VC100): *Digitivalva pulicariae* (Klim.), Kildonan, Arran, 26.vi.1999, leafmines in *Pulicaria dysenterica*, emerged 12.vii.1999. (with J. R. Langmaid) (New to Scotland). *Coleophora adjunctella* Hodgk., saltmarsh near

Prospect Hill, Margnaheglish, Arran, 27.vi.1999, one male swept (New to Arran). *Ebulea crocealis* (Hübn.), Kildonan, Arran, 26.vi.1999, one of several seen. (New to Arran). *Cydia funebrana* (Treits.), Edinburgh, 17.ix.1998, reared from plums imported from Italy, emerged 7.vi.1999.

BROOKER, R. J. & MASTERS, I. D.—*Sceliodes laisalis* (Walk.), Haslemere, Surrey (VC17), at light, 21.viii.1975.

BUTTER, P.—*Sclerocona acutellus* (Eversm.), Devon (SX945895), 16.vi.1999.

CLANCY, S. P.—Pyralidae from the Dungeness area, Kent. *Haimbachia cicatrella* (Hübn.), Dungeness, Kent, 31.vii.1999, a small female example (The third British record). *Hellula undalis* (Fabr.), New Romney, Kent, 20.ix.1999. (The third Kent record). *Evergestis limbata* (L.), Lydd, Kent, 7.vii.1999. (The first Kent record). *Conobathra tumidana* (D. & S.), New Romney, Kent, 2.viii.1999, two specimens taken at separate trap sites. *Pempelia obductella* Zell., Dungeness, Kent, 31.vii.1999. *Vitula biviella* (Zell.), Lydd, Kent, 17 & 26.vii.1998, 5 & 17.vii.1999. The first record was at Lydd on 13.vii.1997, four were recorded there in 1998 and nine in 1999 with a further moth at Greatstone in 1999. Probably established in the Lydd area. (New to Britain). *Plodia interpunctella* (Hübn.), Greatstone, Kent, 10.vii.1999. *Ephestia kuehniella* Zell., New Romsey, Kent, 18.ix.1999. *Homoeosoma nebulella* (D. & S.), Greatstone, Kent, 26.viii.1999.

CLARKE, J.—*Amblyptilia punctidactyla* (Haw.), specimens reared from larva and pupae on *Stachys sylvatica*, Gravetye Forest, East Grinstead, West Sussex, 18.viii.1999, Canon Teign Falls, Hennock, Devon, 10.viii.1999, Jennycliffe, Plymouth, Devon, 13.viii.1999, Staddon Heights, Plymouth, Devon, 13.viii.1999. *Stenoptilia zophodactylus* (Dup.), Stonelees, Sandwich, Kent, 26.viii.1999, reared from flower/seed-heads of *Blackstonia perfoliata* and *Centaurium* sp.

COOK, R. R.—Pyralid moths including *Crambus uliginosellus* Zell., Studland, Dorset, 6.vii.1999. *Thisanotia chrysonuchella* (Scop.), Sandwich, Kent, 17.vi.1999. *Pediasia contaminella* (Hübn.), Parley Heath, Dorset, 29.vii.1999, at light. *Udea fulvalis* (Hübn.), Christchurch, Dorset, vi.1999, reared.

DAVIS, A.—A display of provisional maps from the Pyralid and Plume Recording Scheme. A request for information on microlepidoptera from Radnorshire (VC43) in order to produce a county list.

DOBSON, A. H.—*Epiphyas postvittana* (Walk), Basingstoke, Hampshire. First occurred in exhibitor's garden 8.x.1995 since when it has become a pest, larvae damaging shoots and buds of shrubs and rose cultivars, and 48 in m.v. trap on 31.ix.1999.

ELLIOTT, B. Microlepidoptera taken during 1999, including *Acleris* species reared during 1999. *Teleiodes wagae* (Now.), Killinny and Glencolumbkille, Burren, Co. Clare, taken among hazel scrub. *Dichrorampha sylvicolana* Hein., Loch Inch, early.vii.1999, several disturbed from *Achillea ptarmica*. *Eucosma metzneriana* (Treit.), locality not stated, a strong but very localised breeding colony discovered in 1999 after several were taken in 1998. *Agonopterix astrantiae* (Hein.), Glencolumbkille, Burren, Co. Clare, reared ex larvae in rolled and withered leaves of *Sanicula*. *Depressaria chaerophylli* Zell., Braishfield, Hants., reared from *Chaerophyllum temulentum* growing in a hedge. *Depressaria ultimella* Staint., Droxford, Hants., reared from stems of *Apium nodiflorum* growing in a wet ditch.

GIBBS, D. J. *Bohemannia quadrimaculella* (Boh.), Weston Moor, Somerset, 18.vii.1999, beaten from alder. (First Avon record). *Nemophora minimella* (D. & S.), Max Bog, Somerset, vii.1999, locally common on saw-wort flowers. (Probably first Avon record). *Monochroa palustrella* (Dougl.), Weston Moor, Somerset, 7.vii.1999, at light. *Syncopacma larseniella* (Gozm.), Lower Woods, South Glos., 9.vii.1999.

(Probably first Avon record). *Sorhagenia lophyrella* (Dougl.), Weston Moor, Somerset, 18.vii.1999, beaten from alder buckthorn. (Second Avon record).

HART, C. —*Hellula undalis* (Fabr.) Cury, Mullion, Cornwall, 10.ix.1999.

HARVEY, M. —*Enicostoma lobella* (D. & S.), Holtspur Bottom Butterfly Conservation reserve, Beaconsfield, Bucks. (SU 916914), 29.v.1999, at light. Possibly the first Bucks. record for almost one hundred years.

HECKFORD, R. J. —*Archinemapogon yildizae* Koçak, Speybank, Easterness (VC96), larva in *Fomes fomentarius*, 10.ix.1998 (with M. R. Young), emerged 6.iv.1999. *Coleophora clypeiferella* Hofm., Berry Head, Brixham, Devon (VC3), 31.vii.1999, at light. New to Devon. *Schiffermuelleria subaquilea* (Staint.), Haytor, Devon (VC3), 30.i.1999, larva in spun dead leaves of *Vaccinium myrtillus*, emerged 24.iii.1999. *Batia lambdella* (Don.), roadside, Muir of Dinnet, South Aberdeen (VC92), 18.v.1999, larva in dead *Ulex* stem, emerged 4.vi.1999. New to VC92. *Borkhausenia fuscescens* (Haw.), Webbington, Somerset (VC6), 28.xi.1998, larva in dead leaves of *Chamaecyparis* sp., emerged 9.vi.1999; Bowhill, Exeter, Devon (VC3), 23.i.1999, larva in spun dead leaves, emerged 27.vi.1999. Larvae not previously described in the British Isles. *Tachystola acroxantha* (Meyr.), Plympton, Plymouth, Devon (VC3), 3.iv.1999, pupae in dead *Juniperus* sp. leaves, emerged 25.iv.1999. *Monochroa tenebrella* (Hübn.), Trowlesworthy Warren, Devon (VC3), 1 & 24.v.1999, larvae in stems of *Rumex acetosella*, emerged 20.v.1999 and 10.vi.1999. *Bryotropha basaltinella* (Zell.), Wytham, Oxford (VC22), 12.iv.1987, larvae in *Tortula muralis*, emerged 6–19.vi.1987. Exhibited for comparison with *B. dryadella* (Zell.) *Bryotropha dryadella* (Zell.), Berry Head, Devon (VC3), 16.vi.1984, 28.vi.1986 and 11.vi.1988; Upton Towans, Cornwall (VC1), 4.vi.1997. New to Great Britain; prior to determination of these specimens the only other British specimen was an undated one taken on Jersey, Channel Islands, in the Paris Museum. British specimens are virtually indistinguishable from *B. basaltinella* (Zell.) but the habitat may differ, since all known English specimens are coastal. *Bryotropha terrella* (D. & S.), Trowlesworthy Warren, Devon (VC3), 10.iv.1999, larva in tube amongst *Agrostis* sp. and *Rhytidiadelphus squarrosus*, emerged 15.v.1999 (together with cocoon). Larva possibly not previously seen in the British Isles. *Caryocolum proximum* (Haw.), Wanstead Flats, Essex (VC18), 24.iv.1999, larvae in spun shoots of *Stellaria media*, emerged 4 & 7.vi.1999. *Acleris abietana* (Hübn.), Bridge of Avon, Banff (VC94), 11.ix.1998, pupae on *Abies procera*, emerged 23.ix.1998. New to VC94. *Celypha palustrana* (L. & Z.), Crathie, South Aberdeen (VC92), 17.v.1999, larvae amongst *Dicranum* sp., emerged 20 & 24.vi.1999. *Crambus pascuella* (L.), Bicton Common, Devon (VC3), 4.iv.1999, larva in spun tube amongst *Trichophorum cespitosum*, emerged 5.vi.1999. *Crambus uliginosellus* Zell., Colaton Raleigh Common, Devon (VC3), 3.vi.1999, larvae feeding in spun tubes amongst *Sphagnum capillifolium* but feeding on *Carex flacca* and an unidentified grass, emerged 6.vii.1999. Not previously reared as foodplant and life history had been unknown.

HENWOOD, B.—*Ischnoscia borreonella* (Mill.), Berry Head, South Devon (VC3), 31.vii.1999, two specimens, one netted by the exhibitor and one by B. F. Skinner. A new site for this local moth, otherwise known in Britain only from Portland, Dorset and Torquay, South Devon. *Caloptilia falconipennella* (Hübn.), Kingsteignton, South Devon (VC3) 30.x.1999, cocoon on leaf of *Alnus glutinosa*, emerged 4.xi.1999. (First Devon record). *Phlyctaenia stachydalis* (Germ.), near Great Torrington, North Devon (VC4), 26.vi.1999, two specimens.

KNILL-JONES, S. A. —Microlepidoptera from Isle of Wight (VC10), including from Freshwater, *Niditinea fuscella* (L.), 18.i.1999, larva, reared (First VC10 record). *Blastobasis decolorella* (Woll.), 14.xi.1999. (The first VC10 record). *Evergestis limbata*

(L.), 3 & 10.vii.1999. *Uresiphita polygonalis* (D. & S.), 31.x.1999. *Herpetogramma licarsisalis* (Walk.), 9.xi.1999 (New to Britain) (Plate 2, Fig. 2).

LANGMAID, J. L.—*Digitivalva pulicariae* (Klim.), Kildonan, Isle of Arran, 27.vi.1999, larva on *Pulicaria dysenterica*, emerged 11.vii.1999 (with K. P. Bland) (New to Scotland). *Coleophora alnifoliae* Barasch, Southwick Hants, 5.vi.1999, larvae on *Alnus glutinosa*, emerged 5.vii. 1999. (New to VC11). *Duponchelia fovealis* Zell., Southsea, Hants, 3.ix.1999, at light. (New to Hampshire and fourth British record).

MARTIN, G. & HONEY, M. R.—An exhibit illustrating the ongoing review of the British Lepidoptera collections at the Natural History Museum. A newly completed drawer of *Argyresthia* species including recently donated examples of *A. trifasciata* Staud. and *A. cupressella* Wals.

MCCORMICK, R.—Devon records, the specimens exhibited being not necessarily those on which the record was based. *Calamotropha paludella* (Hübn.), Newton Abbot, 9.vii.1999 (The third Devon record). *Catoptria margaritella* (D. & S.), representing a record at Belstone, Okehampton, 2.viii.1999 by C. Penney. *Eudonea delunella* (Staint.), Great Torrington and Teignmouth, 1999, the species was seen at several locations in VC3 and VC4 during the year. *Parapoynx stratiotata* (L.), Slapton, 11.ix.1999, one of five seen. *Sitochroa palealis* (D. & S.), representing two seen at Hopes Nose, Torquay, 8.vii.1999. *Sclerocona acutellus* (Eversm.), Exeter, two taken during 1999. (The fourth and fifth British records) A further specimen was taken 5.vii.1999. *Diasemia reticularis* (L.), Bideford, 30.vii.1999, (leg. Dr. A. Henderson). (The first Devon record since before 1878). *Cryptoblabes gnidiella* (Mill.) and *Euzophera bigella* (Zell.), specimens reared from pomegranates purchased in Devon, 6.ix.1999, the latter providing the first Devon record.

NASH, S.—Fernham, Berks., *Epiphyas postvittana* (Walk.), 3.xi.1999. *Calamotropha paludella* (Hübn.), 1.viii.1999. *Sitochroa palealis* ((D. & S.), 13.vii.1999. *Pempeliella dilutella* (D. & S.), 2.vii.1999. Durlston Country Park, Swanage, Dorset, *Epiphyas postvittana* (Walk.), 14.xii.1998. *Epischnia bankesiella* Rich., 18.vi.1999.

O'KEEFFE, D.—The British species of the genus *Bucculatrix* (Zell.). *Tischeria dodonaea* Staint., Dartford Heath, Kent, ex mines on *Quercus robur*. (The first Kent record for over fifty years). *Nemophora fasciella* (Fabr.), Wilmington, Kent, 13.vi.1999. *Dichomeris ustalella* (Fabr.) Tintern, Mons. (VC35), 25.vi.1999, one of two at light. (The first county and vice-county record).

OWEN, J.—*Hellula undalis* (Fabr.), Dymchurch, Kent, 19.ix.1999.

PARSONS, M. S.- From Dorset, *Coleophora ochrea* (Haw.), Studland Cliffs, larvae 20.v.1999; *Monochroa suffusella* (Dougl.), East Lulworth, 25.viii.1999; *Helcystogramma lutatella* (H.-S.), larvae 10.vi.1999; *Scythris empetrella* Karsh. & Neils., larvae 23.iii.1999; *Crambus uliginosellus* Zell., Studland Cliffs, 15.vi.1999. From East Sussex, *Metzneria neuropterella* (Zell.), Whitbread Hollow, Eastbourne, 7.viii.1999, several to light; *Hedya nubiferana* (Haw.), Oggs Wood, nr. Eastbourne, 1.vii.1999. From Raynes Park, Surrey, *Anarsia lineatella* (Zell.) larva found in a peach, country of origin unknown, 6.1999; *Scythris limbella* (Fabr.), 18.vi.1999; *Gypsonoma minutana* (Hübn.), 23.vii.1999.

ROUSE, A. *Antigastra catalaunalis* (Dup.), The Warren, Folkestone, Kent, 22.ix.1999 (The sixth Kent record).

SIMS, I. *Stigmella floslactella* (Haw.), Medmenham, Bucks., adults and cocoon ex mines on *Corylus avellana*,16.ix.1994, emerged 1.iv.1995 indoors. *Stigmella carpinella* (Hein.), Old Ponds Copse, Reading, Berks., adult and cocoon ex mine on *Carpinus betulus*, 29.ix.1998, emerged 8.iv.1999, indoors. Possibly new VC22 record. *Stigmella suberivora* (Staint.), University, Whiteknights, Reading, Berks., adults and cocoons

ex mines on *Quercus ilex*, 6.iii.1999, emerged 16.iv.1999 indoors. *Stigmella microtheriella* (Staint.), Medmenham, Bucks., adults and cocoons ex mines on *Corylus avellana*, 20.x.1991, emerged 16.iv.1992 indoors. *Adela cuprella* (D. & S.), River Loddon, Lower Earley, Berks., and Dinton Pastures Country Park, Reading, Berks., both 27.iii.1999. Second and third confirmed localities from VC22. *Antispila treitschkiella* (F. v R.), Medmenham, Bucks., adult and cocoon ex mine on *Cornus sanguinea*, 27.viii.1990, emerged 15.v.1991 indoors. *Bankesia douglasii* (Staint.), Fareham, Hampshire, 17.ii.1999, cases from D. O'Keeffe, all emerged (females) by 10.iii.1999. *Epichnopterix plumella* (D. & S.), Hainault Forest, Chigwell Row, Essex, 14.v.1998, males in flight over grass in hot, sunny weather. *Leucoptera malifoliella* (Costa), Syderstone, Norfolk, ex mines on *Malus pumila*, 9.viii.1998, emerged 7.iv.1999 indoors. *Phyllonorycter lantanella* (Schr.), Lower Earley, Reading, Berks., ex mines on *Viburnum tinus* in garden, 17.iii.1999, emerged 26.iii.1999. *Phyllonorycter strigulatella* (Zell.) Baynes Wood, Greenham Common, Berkshire, adults and mines on *Alnus incana*, 16.xi.1997, emerged 1.ii.1998; Blacknest, Brimpton, Berks., ex *Alnus glutinosa*, 10.xi.1997, emerged 24.ii.1998. *Elachista albifrontella* (Hübn.), Hainault Forest, Chigwell Row, Essex, larvae swept from grasses 10.iv.1999, emerged 8.v.1999.

SOFTLY, R. A.—An exhibit with slides and information on the Crambinae of Hampstead Heath, Middlesex.

STERLING, P. H.—Microlepidoptera recorded by members of the Dorset Moth Recording Network. *Monochroa palustrella* (Dougl.), Portland Bird Observatory (VC9), 31.vii.1999, at light, leg. M. Cade (New to Dorset). *Mompha sturnipennella* (Treits.), Portland Bird Observatory (VC9), 9.viii.1999, at light, leg. M. Cade. (New to Dorset). *Archips oporana* (L.), Hurn, Dorset (VC11), 21.vi.1998, at light, leg. M.Jeffes. (The first vice-county record since 1888). *Acleris logiana* (Cl.), Hurn, Dorset (VC11), 12.ii.1999, at light, leg. M. Jeffes

TREMEWAN, W. G.—*Euchromius ocellea* (Haw.), Towanroath, Chapel Porth, Cornwall, 21.i.1999.

UFFEN, R. W. J.—*Syncopacma albipalpella* (H.-S.), reared by R. J. Heckford from larval spinning on *Genista anglica* collected by the exhibitor at Croxley Common Moor, Rickmansworth, Herts., 1.vi.1999. First Herts. record and the only known extant UK site.

WARNE, B.—*Crocidosema plebejana* (Zell.), Binstead, Isle of Wight, 1.xi.1999.

WEDD, D.—Species recorded at Henley-on-Thames, Oxon., *Evergestis extimalis* (Scop.), 20.vii.1999. *Galleria mellonella* (L.) showing size and colour variation from overlapping broods. *Pempeliella dilutella* (D. & S.) occurred commonly at light in 1999. *Anania verbascalis* (D. & S.) and *Pempelia genistella* (Dup.), both abundant on Jersey and Guernsey during 1999.

FOREIGN LEPIDOPTERA
3RD BENHS EXPEDITION TO BELIZE, 2–22 DECEMBER 1998

1) WARING, P. M. (Leader)—The BENHS has now mounted three expeditions to Belize to examine the Lepidoptera of several contrasting localities. It is a small but interesting former British dependency in Central America, about the same size as Wales. Photographs were shown of (i) the five members of the expedition: Paul Waring, Norman Hall, Roger Kemp, Ian Menzies & Steve Meredith, with the hire car, (ii) a mercury vapour lamp and sheet set-up, constructed by Barry Fox (a member of the 1997 expedition), which was used at the expedition's base at Pook's Hill. Apart from Pook's Hill, the itinerary included the Rio Bravo Special

Conservation and Management Area in the north of Belize (La Milpa), the British Museum (BMNH) field station in the Chiquibul Forest in the centre of the country (Las Cuevas) and the Lubaantun area in the south (Fallen Stones). Considerable progress has been made with identifications, largely by referring to the National Collections in the Natural History Museum, for access to which we are most grateful. (R. Kemp remarked that Belize is poorly represented in lepidoptera collections in this country, which is surprising for a former British colony.)

2) HALL, N. M.—Moths from Belize. Four drawers of provisionally identified material, including representatives of all of the major families. On the expedition NMH collected moths exclusively, concentrating on 'smaller' macros and Pyralid moths. PMW concentrated on butterflies and 'larger' macros (Saturnids, Sphingids and larger Geometrids and Noctuids). The other expedition members helped with the mothing, but collected butterflies and other orders. All moths were killed and pinned in the field and brought back in postal or store boxes. This severely limits the number of specimens that can be transported, but ensures that they are in reasonable condition. The total number was of the order of 1500 moths. They were identified (with varying degrees of confidence) by comparison with the collections in the BMNH. A note was made of the BM drawer in which each species was located. This yields a two-part number, the first part of which (the drawer series number) identifies the family or subfamily, and the second part the number of the drawer within its series. By sorting the moths by the two-part numbers, they are automatically sorted into a systematic order, though this is Hampson's order, dating from near the beginning of the century, and does not conform to the most up-to-date taxonomic views. In the exhibit, the specimens had been sorted into the BM systematic order before being placed in the drawers, and the initial identifications and BM drawer numbers were written on the glass lids with a marker pen. All identifications will need checking before labels are attached to the specimens. Many of the identifications will remain uncertain, even if the specimens are dissected or compared with type specimens—especially if the genus needs revision.

3) KEMP, R. J.—Butterflies from Belize. Examples from differing habitats (selected from about 250 different species identified) and some interesting mimicry rings. (1) Deep forest species, all La Milpa 12.xii.98: *Colobura dirce* L., *Nessaea aglaura* Dbldy, *Tigridia acesta* L. (2) Forest ride & edge species: *Hamadryas feronia farinulenta* Fruhstorfer, Las Cuevas 8.xii.98, *Euptychia libye* L., Lubaantun 16.xii.98, *Chlosyne gaudealis* Bates, Pooks Hill 5.xii.98, *Heliconius erato petiverana* Dbldy, Lubaantun 18.xii.98, *Melanis pixie* Bsdv, Bladen Camp 19.xii.98, *Heliconius doris eratonia* Stdgr, Las Cuevas 8.xii.98, *Aeria eurimedia pacifica* Godman & Salvin (Ithomiinae), Lubaantun 17.xii.98, *Heliconius charitonius* L., La Milpa 14.xii.98, *Macrosoma semiermis* Prout (Hedylidae), Pooks Hill 6.xii.98, *Arawacus mexicana* D'Abrera, Las Cuevas 7.xii.98. (3) Open ground species: *Phoebis argante* F., La Milpa, 14.xii.98, *Aphrissa boisduvalii* Felder, Bladen Camp 18.xii.98, *Siderone thebais* Felder, Las Cuevas 7.xii.98, *Libytheana carinenta* Cr., Bladen Camp 18.xii.98, *Eucides aliphera* Godt, Pooks Hill 20.xii.98, *Eurema boisduvaliana* Feld., Las Cuevas 8.xii.98, *Eurema daira* Godt, La Milpa 12.xii.98. (4) Mimicry Complex I: *Heliconius ismenius telchina* Dbldy (Heliconiidae), Bladen Camp 19.xii.98, *Lycorea cleobaea atergatis* Dbldy (Danainae), Lubaantun 17.xii.98, *Tithorea harmonia hippothous* Godman & Salvin (Ithomiinae), Pooks Hill 5.xii.98, *Mechanitis lysimnia doryssus* Bates (Ithomiinae), Lubaantun 17.xii.98, *Mechanitis polymnia isthmia* Bates (Ithomiinae), Lubaantun 17.xii.98, *Eucides isabella eva* F. (Heliconiinae), Lubaantun 16.xii.98, *Dismorphia amphiona praxinoe* Dbldy (Pierinae), Las Cuevas 9.xii.98, *Hypothyris lycaste dionaea* Hewitson (Ithomiinae), Las Cuevas 8.xii.98. (5) Mimicry Complex II: *Parides areas*

mylotes Bates, Bladen Camp 19.xii.98, *Parides sesostris zestos* Gray, Bladen Camp 19.xii.98, *Parides polyzelus* Feld., Bladen Camp 19.xii.98, *Archonias tereas approximata* Butler (Pierinae), Lubaantun 17.xii.98. Mimicry Complex (3): *Oleria paula* Weymer, Las Cuevas 7.xii.98, *Pteronymia cotytto* Guerin, Las Cuevas 8.xii.98.

BAILEY, K. E. J.—European Butterflies, 1999. (1) *Danaus chrysippus* L. Examples taken in early ix.99 along the coast of N.W. Spain at L'Escala on the Bay of Rosas. According to a local lepidopterist it has been regularly appearing in the area during late summer over the last three years and there is evidence of local breeding. The exhibitor found it to be quite common in suitable areas close to the coast and saw one pair in cop. (2) A photograph of a live female *Apatura ilia* D. & S. f.*clytie* intersex. This was reared from hybrid stock originating from N. French and Spanish (Barcelona) parents. This female was handpaired to a sibling male successfully and many ova were laid but these all failed to develop and the specimen by then was beyond preservation. However the hybrid stock is being maintained. (3) *Euphydryas aurinia* Rott. *beckeri*. A bred aberration similar to *E. aurinia aurinia* ab. *virgata*, recently shown to be a polygenic form. The current breeding stock is believed to have originated in Cataluña and has been maintained for at least 5 years.

CORLEY, M. F. V.—Detritophagous gelechioid moths: In areas such as Southern Europe, North Africa and the Middle East with long hot dry seasons, many species of Lepidoptera have larvae which feed on dead or dying leaves or detritus on the ground. Among these groups are several families of Gelechioidea. Portuguese members of the families Symmocidae, Holcopogonidae and Lecithoceridae were exhibited. Very little is known of the early stages of Symmocidae and Lecithoceridae, but they are believed to be detritophagous. The larvae of *Holcopogon bubulcellus* Stdgr feed in dry cow dung.

16 of the 18 Portuguese Symmocidae were exhibited. Some species require dissection for certain identification—the problem is familiar to British lepidopterists in relation to the genus *Oegoconia* Stainton—but also occurs with species of *Symmocoides* Amsel and *Dysspastus* Gozmany. There are three endemic Portuguese species: *Symmoca revoluta* Gozmany (exhibited) occurs in an area so close to the Spanish border that it must eventually be found over the border; *S. serrata* Gozmany is known from three specimens collected in North Portugal in the early part of this century and one from Tunis in 1926; *Symmocoides gozmanyi* Amsel is only known from a single specimen collected in North Portugal in 1954.

Both Portuguese Holcopogonidae and three of the four Lecithoceridae were exhibited. The latter family is notable among Gelechioidea for the length of the antennae. The species *Euradachtha pallicornella* Stdgr is sexually dimorphic.

Species exhibited: Symmocidae: *Oegoconia quadripuncta* Haw., *O. caradjai* Popescu-Gorj & Capuse, *O. deauratella* H.-S., *Apatema mediopallidum* Wals., *Catasphalma kautziella* Rbl, *Symmoca nigromaculella* Rag., *S. revoluta* Goz, (Gozmany), *S. tofosella* Rbl, *S. torrida* Goz., *S. uniformella* Rbl, *S. signatella* H.-S., *S. alhambrella* Wals., *Symmocoides don* Goz., *S. oxybiellus* Millière, *Dysspastus fallax* Goz., *Stibaromacha ratella* H.-S., Holcopogonidae: *Holcopogon bubulcellus* Stdgr, *Aragonia punctivittella* Zerny, Lecithoceridae: *Homaloxestis briantiella* Trti, *Eurodachtha pallicornella* Stdgr, *E. canigella* Caradja.

EDWARDS, P. J.—Two small collections of moths: 1) from France, near Saumur, Maine-et-Loire, including *Arctornis l-nigrum* Müller and *Minucia lunaris* D. & S. 2) from Spain, La Escala, Gerona province, ix.99, including *Bena prasinana* auctt., which is rare in Gerona. PJE has now seen *Danaus chrysippus* L. there in good numbers for two successive years. This is much further north than it is usually found.

Despite patient searching and watching he could not discover the foodplant. *Asclepias*, the usual foodplant, does not grow in the area.

EZARD, A. S.—Lepidoptera from France 1999: (1) From Roussergues,Tarn, 6-10.vi.99: *Marumba quercus* D. & S., *Zygaena fausta* L., *Odonestis pruni* L., *Meganola togatulalis* Hb., *Rhodostrophia calabra* Petagna, *Amephana anarrhini* Dup., *Omphaelophana antirrhinii* Hb., *Lamprosticta culta* D. & S., *Dysgonia algira* L., *Hyles euphorbiae* L., *Lygephila craccae* D. & S., *Spiris striata* L., *Catephia alchymista* D. & S., *Athetis hospes* Frey., *Coscinia cribraria* L., *Epimecia ustula* Frey., *Cyclophora puppillaria* Hb., *Acontia lucida* Hufn., *Synthymia fixa* F., *Pyrois effusa* Bsdv. (2) From Avrilly, Allier, 11–17.vi.99: *Pungeleria capreolaria* D. & S., *Callimorpha dominula* L., *Stegania trimaculata* Vill., *Aplasta ononaria* Fuess.

FENSOME, B.—Aberrations of *Colias croceus* Fourcroy, bred ix.99 from an egg-laying female taken from Roda, Northern Corfu: (i) a curious male lacking normal black borders on the hindwing and (ii) several females (ab *pseudomas*) with the yellow spotting on the forewing black borders very much reduced.

HALL, N. M.—Lepidoptera collected in Spain (with permissions obtained separately from five of the autonomous regions and from the Parque Natural Cabo de Gata—Nijar in Almeria). The main collecting sites were: Pais Vascos: Parque Garaio in Alava. Castille & Leon: Embalse de Uzquiza in Burgos. Aragon: Biel & Los Monegros in Zaragoza. Cataluña: Sierra de la Creu & El Torn, L'Hospitalet del Infant in Tarragona. Andalucia: El Pozo del Esparto, Vera Playa, Mini Hollywood, Cala Bordonares, Cerro Colorado and Playa de Los Genoveses, all in Almeria. Noctuidae: (1) *Cryphia muralis* Forster, Creu, 3,4&5.viii.99. Unusual forms said to be similar to those found in Cambridge. Though *muralis* is reasonably common in Spain, NMH has not found anything other than the 'normal' form at other localities. (2) *Chortodes dulcis* Oberthür, Garaio, 27.vii.99 & Biel, 28.vii.99. The small black dots on the wing make it easy to identify. It is a highly local species. (3) *Emmelia trabealis* Scop., bred from a gravid female from Monegros, 29.vii.99. The larvae were fed on *Convolvulus*, and examples were passed to Jim Porter for photography. A second female also laid many eggs, but they were infertile. (3) *Phyllophila obliterata* Rmbr, Creu, 3.viii.99. According to Calle (Noctuidos Españoles), it is rare and occurs only along the NE littoral. (4) *Conistra erythrocephala* D. & S. Bred from gravid females from Uzquiza, 4.v.99. (5) *Eublemma jucunda* Hb., El Torn, 30.vii.99. Three black females illustrating the normal considerable size range. NMH has also seen black females in Valencia province but has never seen any reference to them, and has never seen black males. (6) *Zethes insularis* Rmbr, la Creu 5.viii.99 (a rather late date: Calle quotes a range of 20.v to 10.vii). This feeds on *Pistacia*. Geometridae: (1) *Idaea vulpinaria* H.-S., bred from a gravid female, El Torn, 2.viii.99, of the form described as *rusticata* D. & S., which some taxonomists consider a separate species. In *rusticata* the central bar has a characteristic 'teardrop' appearance, and there is a different number of spurs on the hind tibiae. The larvae were fed on *Erica arborea*. (2) *I. elongaria* Rmbr, bred from gravid female, El Torn, 2.viii.99. (3) *I. attenuaria* Rmbr, bred from gravid female from Cerro Colorado, 24.iv.99. The larvae were fed on *Tamarix*. *I. attenuaria* is one of the species that sits like a pug, with the wings not touching the abdomen. (4) *I. deitanaria* Reisser & Weisert (5) *I. subrufaria* Stdgr, both Cabo de Gata 4.99. *deitanaria* and *subrufaria* are both fairly common in Almeria in April & May, but NMH has not seen them at any other time of year. (5) *I. saleri* Dominguez & Baixeras, El Pozo 1&2.v.99, El Torn, 30.vii.99 2.viii.99. NMH believes that he is the only person who has found this species outside Valencia Province, which contains the type locality (El Saler). Discovering it in Almeria on 1st May, extends the known range south from Valencia. He has tried to breed the moth

from gravid females and has discovered that early instar larvae will *only* eat flowers, whereas later instars will eat the leaves of *Erica arborea*. Though he has managed to get several through to final instar, none has yet pupated successfully. (6) *Scopula decolor* Stdgr. Vera 15&16.iv.99. These are much more strongly marked than *decolor* obtained from other localities. They bear a strong resemblance to the illustration of *S. flaccata* Stdgr given by Culot. *decolor* and *flaccata* are presumably extremely closely related. (7) *Crocallis auberti* Oberthür, la Creu 3,4&5.viii.99. This is widespread in Spain but not common and easily overloooked among other *Crocallis* spp. (8) *?Chemerina caliginearia* Rmbr, Uzquiza 4.v.99. This large Geometrid moth is said to have a very distinctive shape, and the specimen has been confidently identified for me as *caliginearia*. However, according to Culot *caliginearia* flies in February – March on the Mediterranean littoral, whereas this specimen was found at an altitude approaching 1000 metres in May. Pyralidae: (1) *Hypotia* sp. nov., la Creu, 3.viii.99. A known, but apparently undescribed, species that has been found previously in Menorca, Morocco and Portugal (M. Honey & M. F. V. Corley, pers. comm.) (2) *Staudingeria yerburii* Butler, Mini Hollywood, 25.vi.97 & El Pozo 1&2.v.99. This phycitid moth is described from North Africa and is not listed by Karsholt & Razowski. Hence it is possibly new to Spain and to Europe. (3) *Eurhodope rosella* Scop. Garaio 7.viii.99 (4) *E. cruentella* Dup. Cabo de Gata 20&22.iv.99. The pink coloration of *rosella* and *cruentella* is unusual for Phycitines. (4) *?Euzopherodes vapidella* Mann, Bordonares 16.x.98 and Genoveses 25.iv.99. (5) *?Bazaria* spp. (At least two species, several localities). Karsholt & Razowski list only one *Bazaria* for Spain *B. ruscinonella* Rag.

HONEY, M. R.—Moths from the Balearic Islands: (i) S'Albufera, Mallorca (ii) S'Albufera des Grau, Menorca (iii) S'Albufereta, Mallorca. The specimens displayed were some of the moths resulting from a two-week trip to Mallorca and Menorca in x.99. Light-trapping was undertaken every night during the visit as part of a current project to monitor the moth diversity of the Balearic Islands. Three areas with slightly different types of habitat were selected. The first two are designated Natural Parks and are sites well known to resident and visiting bird watchers, the third is an area currently under negotiation to be designated as such. All three sites are basically coastal wetland sites that have escaped the threat of development by the tourist industry. The moth fauna of the Balearic Islands is not well documented (only one provisional check list published in 1981) so all the species recorded to date, including those recorded by other visiting lepidopterists, have been added to an updated distributional check list for the islands. In contrast to the butterfly fauna, the moth fauna of the islands seems to be quite diverse and extensive. Some species are easily recognized as they are also resident species in Britain (*Peribatodes rhomboidaria* D. & S., *Menophra abruptaria* Thunb., *Xanthorhoe fluctuata* L., *Scopula ornata* Scop., *Spilosoma urticae* Esp., *Pyrausta despicata* Scop., *Bactra lancealana* Hb., etc.); others are now scarce in Britain (e.g. *Trichophaga tapetzella* L.); others occur in Britain mainly as occasional migrants (*Luperina dumerilii* Dup., *Mythimna loreyi* Dup., *Eublemma parva* Hb., *Antigastra catalaunalis* Dup., *Ancylosis oblitella* Z., *Hellula undalis* F., etc.). The remainder includes species that are widespread in continental Europe and others that are exclusively Mediterranean. Many of the specimens represent new records for Mallorca or Menorca; others are new to the Balearics as a whole (e.g. *Phthorimaea operculella* Z., *Apodia bifractella* Dup., *Ptocheuusa paupella* Z., *Palumbina guerinii* Stt., etc.) and some are new to Spain (e.g. *Elachista contaminatella* Z.). One species of emerald moth (*Kuchleria insignata* Hausmann), that was described as new to science from Spain as recently as 1994, was found on Menorca by one of the project team and additional specimens

were trapped there in October 1999 during this project. Nothing is known of the biology of this species but a closely related species feeds as a larva on *Ephedra* (joint pine). A search of the area in which the moth was found revealed numerous stands of an *Ephedra* species. As the adult moth was already on the wing the local member of the project will conduct a search for larvae next year (2000) during the summer months. A number of specimens remain unidentified, particularly among the smaller microlepidoptera.

MARTIN, G.—Lepidoptera taken in a hamlet 4 km NW of Guilliers, Morbihan, France, over four nights in early vii.99, from an overgrown garden consisting mainly of bracken with mature oaks and elms surrounded by cornfields. Over one hundred and seventy species of Pyralidae and Macrolepidoptera were recorded. The specimens shown were those which are either scarce, extinct or absent from the U.K. Oecophoridae: *Harpella forficella* Scop., Limacodidae: *Apoda limacodes* Hufn., Cossidae: *Cossus cossus* L., Pyralidae: *Synaphe punctalis* F., *Elegia similella* (Zinck), *Sitochroa palealis* D. & S., *Anania verbascalis* D. & S., *Dolicarthria punctalis* D. & S. Nymphalidae: *Nymphalis polychloros* L. (large tortoiseshell). Lasiocampidae: *Odonestis pruni* L. Geometridae: *Tephronia sepiaria* Hufn., *Pseudoterpna coronillaria* Hb., *Scopula nigropunctata* Hufn., *Idaea ochrata* Scop., *Eupithecia breviculata* Donzel. Notodontidae: *Thaumetopoea pityocampa* D. & S., *Tritophia tritophus* D. & S., *Drymonia querna* D. & S. Noctuidae: *Macrochilo cribumalis* Hb. *Pechipogo plumigeralis* Hb., *Parascotia fuliginaria* L., *Polyphaenis sericata* Esp., *Trachea atriplicis* L., *Lacanobia splendens* Hb., *Mythimna vitellina* Hb., *Hadena luteago* D. & S. Lymantriidae: *Arctornis l-nigrum* Müller. Nolidae: *Meganola albula* D. & S.

MIDDLETON, A. P.—Butterflies of Cuba: A sample of 37 species collected in Cuba in vii.99. (A) Atabey, Havana (Suburban): *Phoebis sennae* L. (yellow, white and intermediate forms and f. *sennalba* F. M. Brown), *Eurema messalina* F., *E. nicippe* Cr., *E. lisa* Bsdv. & Leconte, *Ascia monuste* L., *Nathalis iole* Bsdv., *H. andraemon* Hb., *Agraulis vanillae* L. (including an aberrant form lacking dark pigment), *Euptoieta hegesia* Cr., *Anartia jatrophae* L., *Phyciodes phaon* W. H. Edwards, *Calisto herophile* Hb., *Polites baracoa* Lucas, *Hylephila phyleus* Dry, *Pyrgus oileus* L., *Asbolis capucinus* Lucas, *Urbanus dorantes* Stoll, *U. proteus* L. (B) Near Vinales at the western end of the island (agricultural + tobacco region + limestone hills): *Heraclides androgeus* Cr., *Dryas iulia* F. (C) Las Terrazas (near to a small area of surviving rainforest between Vinales and Havana): *Siproeta stelenes* L., *Junonia genoveva* Cr., *Electrostrymon angelia* Hewitson, *Panoquina sylvicola* H.-S. (D) Jibacoa (North coast east of Havana + light woodland): *Eurema larae* H.-S., *Heliconius charitonius* L., *Marpesia eleuchea* Hb., *Lucinia sida* Hb., *Anthanassa frisia* Poey. (E) Near Santiago de Cuba (South-east corner of the island, light woodland close to the beach) *P. agarithe* Bsdv., *Eurema daira* Godt., *Anteos clorinde* Godt., *Battus polydamus* L., *Hamadryas amphichloe* Bsdv., *Phocides pigmalion* Cr.

PARKER, R.—(1) Butterflies from New Zealand xi.98. New Zealand has only 23 species of butterfly, and November is too early in the season for many of them. The definitive work on the subject is *New Zealand Butterflies* by George V. Gibbs 1980. Gibbs splits the species as follows:

Endemic to New Zealand	11 species
Common to Australia and New Zealand in pre-European times	2 species
From Australia and elsewhere, but only since European settlement	3 species
Regular visitors from Australia	2 species
Rare visitors from Australia	5 species
Total	23 species

10 of these were seen: (i) *Pieris rapae* L. Since the Large and Green-veined Whites have not reached New Zealand, the Small White is known simply as "the White butterfly". It is now widespread and common, following an accidental introduction in 1929. (ii) *Danaus plexippus* L. Not uncommon along the cliffs to the south of Christchurch. *plexippus* reached New Zealand in the 1870s: since then it has established a migration and overwintering pattern internal to New Zealand which echoes its behaviour in North America. (iii) *Bassaris gonerilla* F. This relative of our own Red Admiral occurs only in New Zealand and, as a sub-species, 620 kms to the south east on Chatham Island. The larval foodplant, stinging nettle, is not common, and the butterfly is rather local, though widespread. (iv) *Bassaris itea* F., (v) *Lycaena salustius* F. five females were displayed, showing the variability in the purple submarginal band, and the two different forms of the undersides. The coppers of New Zealand are a complex group, possibly comprising more than the four species listed by Gibbs. They live in colonies on the *Muehlenbeckia* vines which grow on wasteland. Three localities were found. They are becoming scarcer, perhaps because landowners are encouraged to eliminate the larval foodplant, which is considered a weed. (vi) *L. feredayi* Hudson. This is more heavily marked in black than *L. salustius*, but does not show sexual dimorphism. (vii) *L. boldenarum* White 'Boulder Copper'. Quite distinct from the preceding coppers, *boldenarum* is more likely to be mistaken for a blue, and flies with the Common Blue (*Zizina*), Its English name suits its habitat, rocky places, so it is amusing that its Latin specific name was given for Helen Bolden, an entomologist's wife. (viii) *Zizina otis* F. ssp. *labradus* Godart & ssp. *oxleyi* Felder Common Blue/Southern Blue. The two subspecies have north/south distributions, with an overlap zone on the east coast of South Island, where hybrids occur. Whilst *labradus* is found in Australia, the morphologically distinct *oxleyi* is a New Zealand endemic. (ix) *Danaus chrysippus* L. & (x) *Cynthia kershawi* McCoy were seen but not taken.

(2) Butterflies in Turkey x.99: 28 species were found around Alanya, on the south coast, between 10.x.99 & 24.x.99: (i) *Danaus chrysippus* L. Plain tiger. (ii) *Pontia edusa* F. (iii) *Lycaena thersamon* Esp. (iv) *Lycaena* sp., possibly *ottomana* Lefebvre or *asabina* H.-S. The specimen had underside hindwing markings very like the Grecian Copper. (v) *Leptotes pirithous* L. (vi) *Zizeeria knysna* Trimen ssp. *karsandra* Moore (vii) *Maniola megala* ob. L. (viii) *Ypthima asterope* Klug. Colonies frequented hot hillsides with a particular type of long grass amongst large rocks, on which they perch and 'disappear', so good is their underside camouflage. (ix) *Gegenes pumilio* Hoffmannseg, also found in the same dry rocky habitat. (x) *Parnara thrax* Hb. (xi) *Carcharodus alceae* Esp. Common on rough ground where mallow grows as a weed. (xii) *Carcharodes stauderi* Reverdin. (xiii) ?*Muschampia proto* Ochs., sage Skipper.

The following were seen, but not exhibited: *Papilio machaon* L., *Pieris brassicae* L., *Pieris rapae* L., *Colias crocea* Fourcroy, *Charaxes jasius* L., *Vanessa atalanta* L., *Cynthia cardui* L., *Lycaena phlaeas* L., *Lampides boeticus* L., *Polyommatus icarus* Rott., *Aricia agestis* D. & S., *Freyeria trochylus* Frey, (the smallest of European butterflies), *Lasiommata megaera* L., *Lasiommata maera* L., *Pararge aegeria* L.

WEDD, D. J. D.—*Heliconius charitonius* L., ex female, Cobo, Guernsey, August 1999. A female *charitonius*, which had escaped from a butterfly house at le Friquet in the centre of Guernsey where hundreds of Heliconids fly loose, was noticed ovipositing on *passiflora*. These were taken home and the butterfly was bred from them. It is a South American species, unlikely to survive even the mildest of Channel Islands winters.

WINOKUR, L.—A gynandromorph of *Gonepteryx cleopatra* L. purchased at the 1999 Amateur Entomologists' Society annual exhibition from Nigel South of Misterton, Somerset, who took it at Párga, Greece (39° 18'N, 20° 23'E) in v.98. The

specimen is predominantly male with areas of pale green/white female coloration on all the wing surfaces. (Plate 2, Fig. 10). The data and dull yellow underside patches identify it as *G. c. cleopatra f italica* Gerhard [= *f. massilensis* Foulquier] (Tolman & Lewington, 1997). Photomicrographs were shown showing selected upperside details.

Diptera

There was a decrease in the number of exhibitors this year, but more exhibits in common with the annual meeting of Dipterists Forum, which was held two weeks earlier. Several species recently recognised as new to the British fauna were included. Progress in the Society's Heathland Flies Biodiversity Project was the subject of an exhibit by the President.

Alexander, K. N. A.—*Oxycera morrisii* Curtis (Stratiomyidae), Hedgley Bottom, East Glos, swept from limestone spring, 17.vii.1999, a new record for the modern county.

Bland, K. P.—A *Botanophila* species (Anthomyiidae) reared from seed pods of *Gentianella amarella* and *G. campestris*, Fealar Estate, Perthshire (NO 0075 and 0077, V.C. 89); larvae were collected 21.ix.1998, adults emerged 20.vi–2.vii.1999, with some parasitism by a *Trybliographa* species; an empty puparium was found in a dehisced seed pod of *G. campestris* at Over Bohespic, Perthshire (NN7361, V.C. 88), 22.x.1999; this species was thought to be *B. gentianae* (Pand., 1900) as previously suggested based on finds in 1997 of vacated seed pods (Bland, 1998, *Dipterists Digest* (Second Series) **5**: 10–11), but examination of adults by Michael Ackland has now indicated that they belong to *B. tuxeni* (Ringdahl, 1953).

Collins, G. A. –Notable Diptera from Surrey in 1999: *Rhagio annulatus* (De Geer) (Rhagionidae), St John's Wood, Dormansland (TQ410415), 8.vi; *R. strigosus* (Meig.) (Rhagionidae), Headley Warren, Leatherhead (TQ191538), 5.vi, close to the known localities around Box Hill; *Acinia corniculata* (Zett.) (Tephritidae), Happy Valley, Coulsdon (TQ309566), 1.ix; *Sciomyza dryomyzina* Zett. (Sciomyzidae), River Wey, Shalford (SU998472), 1.vi, previously known in Surrey from further up the Wey in 1968; *Gymnosoma nitens* (Tachinidae), Howell Hill, Epsom (TQ239619), 28.vii, first recorded in Britain from Box Hill, Surrey in 1956 but recorded from several sites in Kent and Essex in recent years (also see R. A. Jones, 1999, *British Journal of Entomology and Natural History* **12**: 140–141); *Graphogaster brunnescens* Villeneuve (Tachinidae), Arbrook Common, Esher (TQ141627), 4.viii, recorded from three sites in Surrey in 1999.

Godfrey, A. Some miscellaneous Diptera recorded in 1998 (unless otherwise stated): *Dicranomyia goritiensis* (Mik) (Limoniidae), Axmouth Undercliff, Dorset (SY28), 2.vii, at seepages on coastal cliffs; *Chrysops sepulcralis* (F.) (Tabanidae), Hartland Moor, Dorset (SZ946856), 1.vii; *Oxycera terminata* Meig. (Stratiomyidae), Brackets Coppice, Dorset (ST5106), 30.vi; *Thyridanthrax fenestratus* (Fall.) (Bombyliidae), Studland Heath, Dorset (SZ0284), 3.vii; *Parochthiphila spectabilis* (Loew) (Chamaemyiidae), Little Sea (Studland Heath), Dorset (SZ0284), 3.vii, swept from *Phragmites*, the first record outside Cambs; *Stenomicra delicata* (Collin) (Stenomicridae), Morden Bog, Dorset (SY9190), 3.vii, in *Carex* tussocks; *Platycephala umbraculata* (Fabricius) (Chloropidae), Eype Cliffs, Dorset (SY4491), 2.vii, associated with *Phragmites* on coastal landslips; *Scatella ciliata* Collin (Ephydridae), Studland Heath, Dorset (SZ0284), 2.vii; *Coenosia vibrissata* Collin (Muscidae), Hartland Moor, Dorset (SZ946856), 1.vii and Studland Heath, Dorset (SZ023847), 1.vii, found at several sites on the Dorset heathlands; *Cephenemyia*

auribarbis (Meig.) (Oestridae), Cheanna Mhur, Loch Arkaig, Scotland (NN097917), 31.v.1999.

HALSTEAD, A. J.—Some local and scarce Diptera recorded in 1999: *Solva marginata* (Meig.) (Xylomyidae), RHS Garden, Wisley, Surrey, 24.vi, swept from riverbank vegetation; *Choerades marginatus* (L.) (Asilidae), Wisley Common SSSI, Surrey, 28.vii, on an oak (*Quercus*) leaf; *Eutolmus rufibarbis* (Meig.) (Asilidae), Greyspot Hill (Brentmoor Heath), near West End, Surrey, 31.vii, swept in boggy area; *Dolichopus linearis* Meig. (Dolichopodidae), RHS Garden, Wisley, Surrey, 7.vii, swept from riverbank vegetation; *Agathomyia falleni* (Zett.) (Platypezidae), RHS Garden, Wisley, Surrey, 17.viii, swept from riverbank vegetation; *Callicera spinolae* Rond. (Syrphidae) (Plate 2, Fig. 5), Royston, Herts. (V.C. Cambs), 20.ix, on ivy (*Hedera helix*) flowers in an overgrown hedge between gardens, a significant western extension of the range of this species previously recorded in Britain only in East Anglia and Cambs; *Pelecocera tricincta* Meig. (Syrphidae), Chobham Common, north of Gracious Pond Farm, Surrey, 6.vi, on *Heracleum* flower; *Volucella zonaria* (Poda), Knaphill, Surrey, 3.viii, on a leek (*Allium porrum*) flower in the exhibitor's garden—it was noted that this species has become common in the Woking district in the last few years; *Conops strigatus* Wied. in Meig. (Conopidae), Greyspot Hill (Brentmoor Heath), near West End, Surrey, 31.vii; *Melieria cana* (Loew) (Ulidiidae), Plumpton Hall, Morecambe Bay SSSI, Cumbria, 20.vi, swept from saltmarsh; *Dioxyna bidentis* (Rob.-Des.) (Tephritidae), RHS Garden, Wisley, Surrey, 7.vii, swept from riverbank; *Trypeta artemisiae* (F.), RHS Garden, Wisley, Surrey, 19.viii, swept from riverbank; *Liriomyza huidobrensis* Blanchard (Agromyzidae), RHS Garden, Wisley, Surrey, emerged 4–5.viii, reared from leaf mines in *Penstemon*, this fly is an imported notifiable leaf miner;

HODGE, P. J.—Diptera recorded from southern England in 1999: *Leptarthrus vitripennis* (Meig.) (Asilidae), Happy Valley, Coulsdon, Surrey (TQ302571), 10.vi, two females swept; *Dolichopus signifer* Hal. (Dolichopodidae), Rye Harbour Nature Reserve (TQ942180), 4.ix, male swept; *Urophora spoliata* (Hal.) (Tephritidae), Haxton Down, Wilts (SU1950), 14.vii, male swept off saw-wort (*Serratula tinctoria*); *Acinia corniculata* (Zett.) (Tephritidae), Farthing Down, Surrey (TQ2958), 9.vii, female beaten off hawthorn (*Crataegus*); *Cistogaster globosa* (F.) (Tachinidae), Stinchcombe Hill, Glos. (ST7498), 17.vi, two females swept off steep south-facing calcareous grassland.

MILES, S. R. –The three species which are the subject of the Society's Heathland Flies Biodiversity Project were exhibited and details given of the progress made in this project in 1999:

(1) *Thyridanthrax fenestratus* (Fall.) (Bombyliidae). A number of observations of this species were made at Thursley Common NNR, Surrey. These included sucking dust up by the fly using the end of its abdomen and oviposition (egg flicking) into a hole from which a specimen of the solitary wasp *Ammophila pubescens* was seen to fly out. A standard walk was set up on the Common using marked compartments to try to correlate spatial activity of the fly with its surroundings. These observations will be used to determine the most suitable areas in which to excavate nest sites of the possible hosts, *Ammophila* species, to look for fly pupae. A few nests have been marked for excavation in 2000. Provisional results indicate that the fly is more active in those rides not used by horse-riders.

(2) *Bombylius minor* L. (Bombyliidae). This species was seen by several observers in Dorset, including two new sites, Upton and Gore Heaths. Several flower-visiting records were made. Oviposition and dust gathering was also observed by the exhibitor on a 5 foot high vertical eroded sandy cliff on Upton Heath. Steve Crellin

saw several specimens on the Isle of Man. No further progress was made in determining possible hosts.

(3) *Chrysotoxum octomaculatum* Curtis (Syrphidae). A few individuals were seen by the exhibitor in Surrey. These were visiting both broom (*Cytisus scoparius*) and buttercup (*Ranunculus* species) flowers. They occurred in a small area of heathland near and within an area in which the lesser pond sedge (*Carex acutiformis*) was growing. Females of *Chrysotoxum cautum* (Harris) (also exhibited) were seen to oviposit onto the leaves of the *Carex*, as well as on Yorkshire fog (*Holcus lanatus*) and the dorsal surface of *Rubus* leaves. The probably empty egg cases could still be located, affixed to these plants, three months later. A hoverfly larva was found and photographed between a leaf sheath and the main stem of the *Carex* in June.

PARKER, M.—Rare and local species of Diptera recorded in 1999 from Dorset, Hants, Somerset and the Lake District in England; from Morayshire, the Isles of Skye and the Outer Hebrides in Scotland, including a number of common species from the remote island of St Kilda. The grid references of two species of Syrphidae from the vicinity of Grantown-on-Spey are withheld in view of the possible vulnerability of their populations: *Haematopota pluvialis* (L.) (Tabanidae), Hirta, St Kilda, Western Isles (NF100991), 20.vii, male swept from a grassy slope; *Stratiomys potamida* Meig. (Stratiomyidae), Binnegar Farm, Dorset (SY884879), 31.vii, female nectaring on *Pastinaca sativa*; *Dialineura anilis* (L.) (Therevidae), Sandscale Haws, Cumbria (SD1975), 15.vi, one male and one female swept from a grassy sand-dune slope; *Pamponerus germanicus* (L.) (Asilidae), Sandscale Haws, Cumbria (SD1975), 15.vi, 18.vii, female swept from a grassy sand-dune slope; *Anasimyia lunulata* Meig. (Syrphidae), Pollachar Marsh, South Uist, Western Isles (NF746147), 18.vii, female swept from marshland; *Blera fallax* (L.) (Syrphidae), Grantown-on-Spey, Morayshire, 22.vi, male flying around *Rubus idaeus*; *Chalcosyrphus nemorum* (F.) (Syrphidae), Tokavaig, South Skye (NG6011), 23.vi, a male swept from *Ranunculus* species; *Cheilosia soror* (Zett.) (Syrphidae), Crawthorne Farm, Dorset (SY7796), 26.viii, female nectaring on *Heracleum sphondylium*; *Episyrphus balteatus* (De Geer) (Syrphidae), Hirta, St Kilda, Western Isles (NF100991), 20.vii, female swept from a grassy slope; *Eupeodes corollae* (F.) (Syrphidae), Hirta, St Kilda, Western Isles (NF100991), 20.vii, male swept from a grassy slope; *Hammerschmidtia ferruginea* (Fall.) (Syrphidae), Grantown-on-Spey, Morayshire, 26.vi, male nectaring on *Heracleum sphondylium*; *Lejops vittatus* (Meig.) (Syrphidae), Wall Common, Somerset (ST259453), 10.vii, several females swept from *Scirpus maritimus* growing in a dyke; *Meligramma euchromum* (Kowarz) (Syrphidae), Mark Ash, New Forest (SU2407), 9.v, male nectaring on *Euphorbia amygdaloides*; *M. triangulifera* (Zett.) (Syrphidae), Scrubbity Burrows, Dorset (ST9717), 15.v, female and Delcombe Wood, Dorset (ST7805), 16.v, both on *Euphorbia amygdaloides*; *Orthonevra brevicornis* (Loew) (Syrphidae), Ashley Chase, Dorset (SY564878), 25.v, female swept; *Paragus tibialis* (Fall.) (Syrphidae), Stoke Heath, Dorset (SY856893), 7.viii, male hovering over bare sand; *Pipiza lugubris* (F.) (Syrphidae), Crawthorne Farm, Dorset (SY7796), 26.viii, female nectaring on *Heracleum sphondylium*; *Platycheirus clypeatus* (Meig.) (Syrphidae), Hirta, St Kilda, Western Isles (NF100991), 20.vii, female swept from a grassy slope; *P. manicatus* (Meig.) (Syrphidae), Hirta, St Kilda, Western Isles (NF100991), 20.vii, several females swept from a grassy slope; *P. splendidus* Rotheray (Syrphidae), Allt Volgair, South Uist, Western Isles (NF7928), 24.vii, one female swept from a flowery slope in relict woodland; *Sphaerophoria interrupta* (F.) (Syrphidae), Pollachar Marsh, South Uist, Western Isles (NF746147), 18.vii, several males swept from marshland; *Conops strigatus* Wied. (Conopidae), Stoke Heath, Dorset (SY884879), 7.viii, female nectaring on

Senecio jacobaea; *C. vesicularis* L. (Conopidae), Mark Ash, New Forest, Hants (SU2407), 9.v, female on *Euphorbia amygdaloides*; *Myopa fasciata* Meig. (Conopidae), Stoke Heath, Dorset (SY856893), male nectaring on *Senecio jacobaea*.

PERRY, I. Uncommon Diptera found in 1999: *Chrysopilus laetus* Zett. (Rhagionidae), Lode, Cambs, reared from the rotting trunk of a fallen poplar, adults emerging in late May; *Haematopota bigoti* Gobert (Tabanidae), Whiteford Burrows, Glam., 15.vii, males swept from transitional marsh; *Hybomitra expollicata* (Pand.) (Tabanidae), Farlington Marshes, Hants, 23.vii, a female resting on emergent vegetation in a brackish ditch; *Thereva fulva* (Meig.), (Therevidae), Whiteford Burrows, Glam., 15.vii, swept from sallows and Oxwich, Glam., 11.vii, swept from dunes; *Chersodromia cursitans* (Walk.) (Hybotidae), Sandscale Haws, Cumbria, 18.vi, running around on damp sand where seepages occurred at the top of the beach; *Empis impennis* Strobl (Empididae), Farley Mount Country Park, Hants, 21.vii, swept from calcareous grassland; *Myopites inulaedyssentericae* Blot (Tephritidae), Wicken Fen, Cambs, 3.vii, swept from its food plant fleabane (*Pulicaria dysenterica*), new vice-county record; *Chaetorellia loricata* (Rond.) (Tephritidae), Martin Down, Hants, 22.vii, swept from its food plant greater knapweed (*Centaurea scabiosa*); *Orellia falcata* (Scop.) (Tephritidae), Oxwich, Glam., 11.vii, swept from dune slack; *Salticella fasciata* (Meig.) (Sciomyzidae), Holme Dunes, Norf., 8.v and 5.vi, swept from dunes; *Elachiptera rufifrons* Duda (Chloropidae), Farlington Marshes, Hants, 23.vii, swept from brackish ditches; *Delina nigrita* (Fall.) (Scathophagidae), Holme Dunes, Norf., 8.v, swept from dune slack.

PLANT, C. W. *Syrphus* ? *rectus* Osten Sacken (Syrphidae), ? new to Great Britain. A single female, reared from a larva on *Prunus spinosus* at Bishop's Stortford, Herts, during vi.1987. This hoverfly was recently added to the Irish fauna by Martin Speight (1999. *Dipterists Digest* (Second Series) **6**: 85–91). Females have areas of the wing membrane without microtrichia (unlike *S. ribesii* (L.) and *S. torvus* Osten Sacken), but the hind femora are yellow (unlike *S. vitripennis* Meig.). Males cannot be separated from *S. vitripennis* on present knowledge.

Syrphus rectus is a north American species. In adding it to the European list in 1996, Pierre Goeldlin (*Bulletin de la Société entomologique Suisse* **69**: 157–171), found a number of differences between European and American examples and so placed the European ones in a new subspecies *bretolensis*. There is, however, some debate over whether this is a valid species in Europe or whether it is a form of *Syrphus vitripennis*. The specimen exhibited had the hind femora entirely yellow, whereas typical *S. rectus bretolensis* (described from only three specimens), has the base of the hind femora narrowly black (for a distance that is less than the width of the femur). Another problem is that all of the hairs on the hind femora of this specimen are yellow as in *S. vitripennis*, whereas in *S. rectus bretolensis* they are black. The shape of the probasisternum (a plate on the front of the thorax behind the head), which serves fairly well to separate the three previously known British species of *Syrphus*, is more or less identical to that of *S. vitripennis*.

STUBBS, A. E.—Craneflies (Tipulidae and Limoniidae) and hoverflies (Syrphidae) from six mainly woodland sites in East Kent, early v.1999:

(a) Denge Wood (TR1052 etc.), 6 and 7.v, a Woodland Trust reserve on the dip slope of the chalk, with grassland, coppice and coppiced glades with a good flora, including plenty of wood spurge (*Euphorbia amygdaloides*): *Tipula pabulina* Meig. (Tipulidae), male, a local species of calcareous soils in v, easily overlooked; *Tipula hortorum* L. (Tipulidae), male and female, a male was found feeding at wood spurge flowers, others were common on a dull morning flying over a valley bottom area coppiced about two years previously; *Dicranomyia mitis* (Meig.) (Limoniidae), a

species complex, the exhibit being of the true *mitis*, the only specimen seen in East Kent in two weeks whereas it had been expected to be relatively frequent on calcareous soils, the conclusion being drawn that droughts of previous years have held down its population; *Epistrophe melanostoma* (Zett.) (Syrphidae), male and female at wood spurge flowers, others being seen, a recent colonist to Britain with most records being from Surrey; *Eupeodes* species indet. (Syrphidae), male and female at wood spurge flowers, close to *E. nielseni* (Dušek and Láska) and *E. nitens* (Zett.) but does not fit either; *Meligramma euchromum* (Kowarz) (Syrphidae), several seen at wood spurge flowers, an elusive spring species; *Rhingia rostrata* (L.) (Syrphidae), two females at hawthorn (*Crataegus*) flowers, others seen; the suggestion was made that it develops in badger setts in woodland (a sett was seen), but the fly is difficult to find with East Kent being particularly well represented in records; it was also noted that *R. campestris* Meig. was common at this site but only visiting herbaceous flowers.

(b) Child's Forstal, Blean Woods (TR176644), 7.v, a small wood with coppice, purchased by Eric Bradford, the Society's former Curator, in order to safeguard this part of the Blean Woods complex, and passed to the Kent Wildlife Trust at his death: *Tipula pseudovariipennis* Czizek (Tipulidae), male and female, a rare and poorly known species, the first time that the exhibitor had found it in numbers yet only one (interpreted as a possible wind-blown stray) was seen in the adjacent Clowes Wood, which is much bigger; *Tipula varipennis* Meig. (Tipulidae), male and female, a common woodland species in the spring exhibited for comparison; the females of both species are black bodied but the wings of *varipennis* are short and the front femora extensively dark and thickened. The males are less easy to separate but the femora of *varipennis* are extensively dark, the wing markings much stronger and the abdomen is very much blacker than in *pseudovariipennis*.

(c) Wye, 10.v: *Epistrophe melanostoma* (Zett.) (Syrphidae), female, just east of Coldharbour Farm, where a roadside path runs through a strip of woodland (TR068465); *Cheilosia nigripes* (Meig.) (Syrphidae), female, swept under extremely windy conditions from a tiny piece of woodland in an exposed position on top of the downs and assumed to be a wind-blown stray from lower on the downs (approximately TR074470).

(d) Sandwich, at north end of dunes, 11.v (TR346616), alluvial levels with brackish ditches which lie behind the dunes and adjoining the estuarine River Stour, the finds being in a short section of ditch with sea club-rush (*Bolboschoenus maritimus*), just within National Trust land forming part of a complex Nature Reserve: *Erioptera* (*Mesocyphona*) *bivittata* (Loew) (Limoniidae), two males, mainly known from the north Kent marshes and to a lesser extent the East Anglian coast, part of the specialist brackish ditch fauna that is now highly localised because most habitat has been drained or over-managed; *Molophilus pleuralis* de Meijere (Limoniidae), male, a more widespread brackish species since it prefers very mildly saline conditions.

(e) Church Wood, 15.v (TR15), an RSPB Reserve and part of the Blean Woods complex; an extensive programme to restore coppice management and to diversify woodland structure was well advanced; there were remnants of heathland and some of the more open rides had tormentil (*Potentilla erecta*); locally there were good stands of wood spurge in flower and woodland streams added to the diversity: *Meligramma euchromum* (Kowarz) (Syrphidae), male, several seen at wood spurge flowers; *Sphaerophoria fatarum* Goeldlin de Tiefenau (Syrphidae), male, locally frequent visiting tormentil flowers along woodland rides and a few seen more generally in open areas, perhaps typically a wet heath species, certainly in the north; it was also noted that short-bodied *Sphaerophoria* species have become very localised

in woodland since only in some of the larger woods has there been continuity of woodland rides.

(f) Thornden Wood, 7.v (TR155634), a large wood of the Blean Woods complex, with extensive coppice remaining, now better managed with some fine habitat amidst less interesting areas: *Dicranomyia affinis* (Schumm.), one of the splits from the *mitis* (Meig.) complex (not yet formally published), male and female, swept from sallow (*Salix*) regrowth along wet ditches in a ride with some tormentil, normally a heathland species and very scarce in the south so its occurrence here and at Church Wood is of note.

STUBBS, J.—A selection of photographs taken at the Dipterists Forum autumn 1999 field meeting based at Oxford; these showed participants determining and discussing finds at the Hill End Study Centre, adjacent to Wytham Wood, where the evening sorting took place and also a few scenes of celebration taken after most of those present had finished sorting their catches.

COLEOPTERA

ALEXANDER, K. N. A.—A selection of the more interesting beetles encountered during 1999. Species prefixed with an asterisk (*) are new vice-county records. **Ampedus elongantulus* (F.) (Elateridae), Gulf Scrubs, Colesbourne, E. Glos., on grass blade, trackside, 16.v.1999; **Silis ruficollis* (F.) (Cantharidae), Lydney Marsh, W. Glos., in reedbed, 26.vi.1999; *Pyropterus nigroruber* (Deg.) (Lycidae), Staindale Wood, N.-E. Yorks., on bracken in oak wood, 19.vii.1999, second record for N. York Moors National Park; *Hallomenus binotatus* (Quensel) (Melandryidae), Bridestones Reserve, N.-E. Yorks., beaten from heather close to *Laetiporus sulphureus* bracket, 21.vii.1999; *Tetratoma desmaresti* Latr. (Tetratomidae), Bransdale, N.-E. Yorks., knocked off dead lower branches of old oaks, 15.ix.1999; *Polydrusus mollis* (Ström) (Curculionidae), Bigsweir Wood, Wye Gorge, W. Glos., 24.iv.1999, very rare in county; *Anthonomus pomorum* (L.) (Curculionidae), Woolaston Lime Coppice, W. Glos., knocked off *Clematis* liana, 26.vi.1999, very rare in county; *Curculio betulae* (Stephens) (Curculionidae), Low Wood, Bransdale, N.-E. Yorks., off birch, 23.vii.1999.

BARCLAY, M. V. L.—(1) Some notable Coleoptera collected during the past five years. *Platyderus ruficollis* (Carabidae), Natural History Museum garden, Middx, 26.xi.1999; *Agonum sexpunctatum* (L.) and *Pterostichus angustatus* (Dufts.) (Carabidae) and *Acritus homoeopathicus* Wollast. (Histeridae), Ockham Common (near Bolder Mere), Surrey, in a bonfire heap, 26.iv.1998; *Trox scaber* (L.) (Trogidae), Tynemouth Street, Fulham, Middx, common in bones, fish skeletons and faeces buried by cats in garden; *Saprosites mendax* Blackburn (Scarabaeidae), Wimbledon, Surrey, under bark of dead oak in frass of *Cylindrinotus laevioctostriatus* (Goeze) (Tenebrionidae), 20.iii.1996; *Uleiota planata* (L.) (Cucujidae), Wisley Common, Surrey, under pine bark, 1.v.1999; *Tetratoma desmaresti* Latr. (Tetratomidae), Bookham Common, Surrey, sieved from under fungus-killed oak, 14.iii.1999; *Molorchus umbellatarum* (von Schr.), White Downs, Surrey, on dogwood blossom, 17.vi.1998; *Gracilia minuta* (F.) (Cerambycidae), Gwent Levels, Mon., in pan trap, vii.1999; *Scolytus rugulosus* Müll. (Scolytidae), Wimbledon, on fruit-wood pile (*Prunus* sp.), 5.vii.1995.

(2) A weevil new to Britain: *Otiorhynchus armadillo* (Rossi) (Curculionidae), Chelsea, Middx, one specimen found outside Marks and Spencer, 28.viii.1998, lives in central European mountain ranges.

(3) Notable beetles collected in a flight interception trap between 17.vi.1998 and 8.vii.1998 at Silwood Park, Berks. One species (prefixed *) is new to Berks. *Plegaderus dissectus* Er. (Histeridae), *Stenichnus godarti* (Latr.) (Scydmaenidae), *Euplectus nanus* (Reichenb.) (Pselaphidae), *Ampedus rufipennis* (Steph.) and *Panspoeus guttatus* Sharp (Elateridae), *Aulonothroscus brevicollis* (de Bonvoul.) and **Hylis olexai* (Palm) (Eucnemidae), *Hadrobregmus denticollis* (Creutz in Panz.) (Anobiidae), *Tritoma bipustulata* F. (Erotylidae), *Aderus oculatus* (Payk.) (Aderidae).

(4) *Synchita humeralis* (F.) (Colydiidae), Wisley Common, 1.v.1999 and *S. separanda* (Reitt.) (Colydiidae), Richmond Park, Surrey, under sycamore bark, 6.x.1996, to show the difference in elytral shape between the two species.

(5) A comparison between two extremely similar leaf beetles: *Cryptocephalus biguttatus* (Scop.) and *C. bipunctatus* (L.) var. *thomsoni* Weise. (Chrysomelidae). Specimens exhibited were: *C. biguttatus*, Moscow district, Russia, 27.vii.1997; *C. bipunctatus* (typical form) White Downs, Surrey, 11.vi.1995 and *C. bipunctatus* var. *thomsoni*, Wisley Common, Surrey, 8.vi.1999 and 11.vi.1999.

(6) Comparison between two superficially similar *Cryptocephalus* species (one non-British). *C. bilineatus* (L.) (Chrysomelidae), White Downs, Surrey, 11.vi.1995 and *C. vittatus* Suff. Les Mielles, Jersey, extremely common on broom, 9.vii.1988.

BOOTH, R. G.—(1) A species of ladybird native to eastern Australia, possibly originating from a nearby garden centre: *Rhyzobius lophanthae* (Blaisdell) (Coccinellidae), Morden Park, Surrey, TQ244672, 1.iv.1999, a single specimen found crawling up the trunk of an ash tree by D. A. Coleman.

(2) A selection of rare or notable species. *Dromius vectensis* Rye (Carabidae), Trerathick Point, W. Corn., SW846686, a male by grubbing at the base of *Plantago* on a poorly vegetated cliff-top, 31.vii.1998 (apparently the first record for the north Cornish coast); *Lionychus quadrillum* (Dufts.) (Carabidae), Seaton, E. Corn., SX296542, several under stones and gravel at base of cliff, 22.viii.1999 (first post-1970 record for vice-county); *Helophorus longitarsis* Wollast. (Hydrophilidae), Beddington sewage farm, Surrey, TQ2967, male in actinic light trap by D. A. Coleman, 17.viii.1998; *Ptomaphagus varicornis* (Rosenh.) (Leiodidae), Bradenham, Bucks., SU828974, female in pitfall trap on an experimental set-aside plot at edge of cereal field, v.1998, first Buckinghamshire record; *Acylophorus glaberrimus* (Herbst) (Staphylinidae), Burley Street, New Forest, S. Hants, SU2004, 3 in boggy area, 23.ix.1998, possibly the first British record since 1970s; *Philonthus lepidus* (Grav.) and *Tachyporus scitulus* Er. (Staphylinidae), Merthyr Mawr Warren, Glam., SS8676, 3 and 2 specimens respectively by sieving moss and grass on the dunes, 7.iv.1999, (*P. lepidus* not recorded from Wales according to Hyman & Parsons, 1994); *Ocyusa nitidiventris* Fagel (Staphylinidae), Isle of Grain, W. Kent, TQ892755, female by sieving strand-line debris on sea shore, 11.iv.1999; *Psammodius* (*Brindalus*) *porcicollis* (Ill.) (Scarabaeidae), Whitsand Bay, E. Corn., SX35, 1 on 25.viii.1999 and 2 on 25.viii.1999, in sand around roots of *Ononis* and grass at base of cliff (the first 20th century British record); *Bruchidius varius* (Ol.) (Chrysomelidae), Ashtead Common, Surrey, TQ1759, male swept from roadside ditch, 12.ix.1998; *Glocianus moelleri* (Thoms.) (Curculionidae), Gallows Hill, S. Wilts., ST949242, male collected in a Vortis suction sampler from downland by S. Mortimer and colleagues, 18.vi.1998.

(3) A selection of species from a flight interception trap at Silwood Park, Berks. between July 1998 and May 1999. *Leiodes lucens* (Fairm.) and *Agathidium confusum* Bris. (Leiodidae), *Stenichnus godarti* (Latr.) (Scydmaenidae), *Quedius aetolicus* Kr., *Aleuonota rufotestacea* (Kr.) and *Atheta inquinula* (Grav.) (Staphylinidae), *Clambus pallidulus* Reitter and *C. simsoni* Blackburn (Clambidae),

Cryptophagus falcozi Roubal, *C. confusus* Bruce, *C. labilis* Er. and *C. micaceus* Rey (Cryptophagidae).

(4) A selection of rare or notable species from surveys in the New Forest, S. Hants in May and Sept. 1999. *Medon apicalis* (Kr.), *Gyrophaena munsteri* Strand, *Atheta glabricula* Thoms. and *A. parens* (Muls. & Rey) (Staphylinidae); *Rhizophagus nitidulus* (F.) (Rhizophagidae), *Colydium elongatum* (F.) (Colydiidae), *Ernoporus fagi* (F.) and *Trypodendron signatum* (F.), Bramshaw, SU2515, 20–23.v.1999; *Baeocrara variolosa* (Muls. & Rey) and *Acrotrichis dispar* (Matth.) (Ptiliidae), *Gyrophaena pulchella* Heer (Staphylinidae), Bramshaw, SU2515, 19.ix.1999; *Dendroxena quadrimaculata* (Scop.) (Silphidae), *Atomaria turgida* Er. (Cryptophagidae), Pinnick Wood, SU2706, 22.v.1999; *Anoplodera sexguttata* (F.) (Cerambycidae), Brinken Wood, SU2706, 21.v.1999; *Ampedus cinnabarinus* (Esch.) (Elateridae), Warwick Slade, SU 2706, 21.v.1999, larva reared from rotten beech log and emerged ix.1999; *Ptenidium brenskei* Flach (Ptiliidae), *Atheta hygrobia* (Thoms.) (Staphylinidae), Warwick Slade, SU2706, 19.ix.1999; *Euplectus fauveli* Guillebeau (Pselaphidae), Sloden Wood, SU2112, 23.v.1999; *Ptenidium turgidum* Thoms. (Ptiliidae), Denny Wood, SU3305, 17.ix.1999; *Stenus kiesenwetteri* Rosenh., *Paederus caligatus* Er. and *Acylophorus glaberrimus* (Herbst) (Staphylinidae), *Longitarsus nigerrimus* (Gyll.) (Chrysomelidae), Black Down, SU3407, 18.ix.1999.

GIBBS, D. J.—*Haliplus mucronatus* Steph. (Haliplidae), Weston Moor, N. Som., ST4473, well established in grazing marsh ditches, 29.vii.1999; *H. variegatus* Sturm (Haliplidae), Weston Moor, N. Som., ST4473, in two ditches on grazing marshes, 16.viii.1999, first record for Avon; *Hydaticus transversalis* (Pontoppidan) (Dytiscidae), Weston Moor, N. Som., ST4473, fairly frequent in grazing marsh ditches, 11.viii.1999; *Omaloplia ruricola* (F.) (Scarabaeidae), Browns Folly, N. Som., ST7966, in calcareous grassland, 10.vii.1999, first Somerset record; *Cantharis fusca* L. (Cantharidae), Uphill, N. Som., ST3158, 23.v.1999 and Weston Moor, N. Som., ST4473, 8.vi.1999; *Aromia moschata* (L.) (Cerambycidae), Weston Moor, N. Som., ST4473, on hogweed, 4.viii.1999, probably the second record for Avon.

HACKETT, D.—Some notable Coleoptera collected in 1999. *Bembidion saxatile* Gyll. (Carabidae), Dunwich cliff, E. Suff., TM480707, at roots of *Plantago* in slipping sand, 6.ix.1999; *Onthophagus joannae* Goljan (Scarabaeidae), Watlington Hill, Oxon., SU705935, in rabbit midden, 4.vii.1999; *Omaloplia ruricola* (F.) (Scarabaeidae), Watlington Hill, Berks., SU705935, 4.vii.1999; *Hemicoelus fulvicornis* (Sturm) (Anobiidae), Highgate Wood, Middx, TQ283887, beaten off oak twigs, 5.viii.1998; *H. nitidus* (Herbst) (Anobiidae), Highgate Wood, Middx, TQ283887, in flight interception trap, 5.viii.1998; *Uleiota planata* (L.) (Cucujidae), Larks Wood, S. Essex, TQ382928, under bark of cut beech log, 2.vii.1999; *Triplax aenea* (Schaller) (Erotylidae), Larks Wood, S. Essex, TQ382928, in *Pleurotus* on beech, 2.vii.1999; *Pycnomerus fuliginosus* Er. (Colydiidae), White House Wood, S. Essex, TQ397916, 9.vii.1999; *Mycetochara humeralis* (F.) (Tenebrionidae), Larks Wood, S. Essex, TQ382928, under bark of damaged oak, 2.vii.1999; *Lissodema quadripustulatum* (Marsh.) (Salpingidae), Larks Wood, S. Essex, TQ382928, on beech trunk, 2.vii.1999; *Ischnomera cyanea* (F.) (Oedemeridae), Hampstead Heath, Middx, TQ2787, crawling up heart-rotten sycamore near Viaduct Pond, 21.v.1999; *Bruchidius varius* (Ol.) (Chrysomelidae), Highgate depot, Middx, TQ270887, swept 31.viii.1999, a new county record; *Kalcapion semivittatum* (Brentidae), Leyton churchyard, S. Essex, TQ376868, off *Mercurialis annua*, 22.vi.1999; *Coeliodes erythroleucos* (Curculionidae), Larks Wood, S. Essex, TQ382928, beaten off oak, 2.vii.1999.

HALSTEAD, A. J.—Some scarce or local Coleoptera taken in 1999. *Pterostichus lepidus* Leske (Carabidae), Whitmoor Common, Surrey, pitfall trap on dry heath, 18.vii.1999; *Cantharis obscura* (L.) (Cantharidae), Greatcalf Haw, near Ulpha, Cumbria, swept in deciduous woodland, 16.vi.1999; *Platycis minuta* (F.) (Lycidae), White Downs near Westcott, Surrey, swept from hawthorn scrub, 8.viii.1999; *Lymexylon navale* (L.) (Lymexylidae), RHS Garden, Wisley, Surrey, ovipositing on felled oak trunk, 23.vii.1999; *Colydium elongatum* (F.) (Colydiidae), Newlands Corner, Surrey, swept near dead beech, 23.v.1999; *Osphyia bipunctata* (L.) (Melandryidae), Therfield Heath (Church Hill), near Royston, Herts., female swept off hawthorn, 4.v.1999; *Donacia clavipes* (F.) (Chrysomelidae), Leighton Moss RSPB Reserve, near Silverdale, W. Lancs., swept off reeds, 14.vi.1999; *Cryptocephalus bilineatus* (L.) (Chrysomelidae), Newlands Corner, Surrey, swept off chalk grassland, 1.viii.1999; *C. punctiger* (Payk.) (Chrysomelidae), Whitbarrow Scar NNR, near Kendal, Cumbria, swept off birch, 13.vi.1999; *Longitarsus ballotae* (Marsh.) (Chrysomelidae), Royston, Herts., on *Ballota nigra*, 5.iv.1999; *Rhynchites cavifrons* Gyll. (Attelabidae), Thursley Common NNR, Surrey, swept off birch, 22.v.1999; *R. cupreus* (L.) (Attelabidae), *Orobitis cyaneus* (L.) (Curculionidae), Sandscale Haw, near Dalton-in-Furness, Cumbria, 15.vi.1999; Newlands Corner, Surrey, swept off rowan flowers, 25.iv.1999

HARVEY, M.—*Harpalus dimidiatus* (Rossi) (Carabidae). Streatley, Berks., SU592799, 2.v.1997, a male found at The Hollies (a National Trust property) near an area of downland that had been scraped back to bare chalk two years previously. Before this the area had a history of disturbance, being used, among other activities, for motorbike scrambling.

HOARE, D. I. B.—A selection of scarce beetles collected during 1998 and 1999, including two unusual varieties. *Notiophilus aesthuans* (Mots.) (Carabidae), Findhorn, Elgin, in open on dunes, 31.v.1999; *Bembidion litorale* (Ol.) (Carabidae), Glenfeshie, Easterness, dark form on sandy area on river shingle, 30.v.1999; *Agabus arcticus* (Payk.) (Dytiscidae), *Dytiscus lapponicus* Gyll. (Dytiscidae) and *Gyrinus opacus* Sahlb. (Gyrinidae), Lecht Pass, Banff., in pool, 2.vi.1999; *Platydracus latebricola* (Grav.) (Staphylinidae), Glenmore, Easterness, near nest of *Formica exsecta* Nylander (Hymenoptera: Formicidae), collected by G. Jones, 29.vi.1999; *Ampedus elongantulus* (F.) and *A. quercicola* du Buyss (Elateridae), Gritnam Wood, New Forest, S. Hants, off *Crataegus* blossom, 22.v.1999; *A. sanguinolentus* (Schrank) (Elateridae), Gritnam Wood, New Forest, S. Hants, off *Pinus*, 22.v.1999; *Aplotarsus incanus* (Gyll.) var. *ochropterus* Steph. (Elateridae), near Loch Morlich, Easterness, swept, 26.v.1999; *Paraphotistus nigricornis* (Panz.) (Elateridae), Gritnam Wood, New Forest, S. Hants, swept, 22.v.1999; *Tillus elongatus* (L.) (Cleridae), Bishop's Dyke, New Forest, S. Hants, on beech log, 19.v.1998; *Coccinella quinquepunctata* L. (Coccinellidae), Carron, Elgin, shingle on R. Spey, 29.v.1999; *Orthocerus clavicornis* (L.) (Colydiidae), Findhorn, Elgin, under stone on dunes, 31.v.1999; *Leptura sexguttata* F. (Cerambycidae), Whitley Wood, New Forest, S. Hants, off umbel, 22.v.1999; *Donacia clavipes* F. (Chrysomelidae), Wicken Fen, Cambs., off *Phragmites*, 20.vi.1999; *Plateumaris braccata* (Scop.) (Chrysomelidae), Chippenham Fen, Cambs., off *Phragmites*, 19.vi.1999; *Cryptocephalus sexpunctatus* (L.) (Chrysomelidae), Carron, Elgin, female off *Betula*, 29.v.1999 (this specimen was kept alive and 300 eggs were laid in early to mid-June).

HODGE, P. J. 25 species of Coleoptera from various locations in southern Britain. New vice county records are marked with an asterisk (*). **Harpalus melleti* Heer (Carabidae), Rye Harbour, E. Sussex, TQ934180, in moss growing on shingle beach, 5.v.1999; **Badister meridionalis* Puel (Carabidae), West Dean Brooks, E. Sussex, TQ514004, female in edge of pond, 27.ix.1999; *Nebrioporus canaliculatus*

(Lacordaire) (Dytiscidae), Dungeness, E. Kent, TR065198 in new pond, 12.viii.1999; **Aeletes atomarius* (Aubé) (Histeridae), Stansted Forest near Rowland's Castle, W. Sussex, SU747105, in fallen beech trunk, 1.viii.1999; **Saprinus virescens* (Paykull) (Histeridae), near Wicken Fen, Cambs., TL5470, swept off mayweed in field gateway with *Gastrophysa polygoni* (L.) (Chrysomelidae), 22.viii.1999; **Ptenidium turgidum* Thomson (Ptiliidae), Stansted Forest near Rowland's Castle, W. Sussex, SU747105, in fallen beech trunk, 1.viii.1999; *Rugilus similis* (Erichson) (Staphylinidae), Cowdray Park, W. Sussex, SU901222, male swept in lime avenue, 14.v.1999; **Philonthus nitidicollis* (Boisduval & Lacordaire) (Staphylinidae), near the Pells swimming pool, Lewes, E. Sussex, TQ413107, male swept at edge of derelict marshy meadow, 1.iv.1999; **Philonthus spinipes* Sharp (Plate 2, Fig. 8) and *Gabronthus thermarum* (Aube) (Staphylinidae), Eighteen Pounder Farm, Guestling, E. Sussex, TQ830146, in pile of stable manure, 2.iv.1999; *Cypha nitidus* (Palm) (Staphylinidae), Stansted Forest near Rowland's Castle, W. Sussex, SU747105, male in fallen beech trunk, 1.viii.1999; **Athous subfuscus* (Muller) (Elateridae), Black Down near Haslemere, W. Sussex, SU9130, female swept off grass/young birch, 22.vi.1999; **Ptinus dubius* Sturm (Ptinidae), The Crumbles near Eastbourne, E. Sussex, TQ647026, male and female beaten off pine *Pinus* sp. growing on shingle beach, 26.x.1999; *Aplocnemus nigricornis* (F.) (Melyridae), Old Lodge Nature Reserve, Ashdown Forest, E. Sussex, TQ462304, one swept, 11.v.1999; *Malachius aeneus* (L.) (Melyridae), Stickling Green, N. Essex, TL473327, several swept off grassland vegetation, 9.vi.1999; **Cryptophagus confusus* Bruce (Cryptophagidae), Stansted Forest near Rowland's Castle, W. Sussex, SU747105, male in fallen beech trunk, 26.vii.1999; **Atomaria umbrina* (Gyllenhal), (Cryptophagidae), Stansted Forest near Rowland's Castle, W. Sussex, SU738106, male at base of large beech stump, 1.viii.1999; **Rhyzobius chrysomeloides* (Herbst) (Coccinellidae) and *Melanophthalma transversalis* (Gyllenhal) (Latridiidae), The Crumbles near Eastbourne, E. Sussex, TQ639024, 26.x.1999, several beaten off pine *Pinus* sp. growing on shingle beach; *Diaperis boleti* (L.) (Tenebrionidae), Peasmarsh, E. Sussex, TQ909224, one in *Laetiporus sulphureus* fungus fallen off a white willow *Salix alba* trunk, 10.ix.1999; *Tetratoma desmaresti* Latreille (Tetratomidae), Knole Park, W. Kent, TQ548538, beaten off dead oak bough 10.x.1999 and St. Dunstan's Farm, Heathfield, E. Sussex, TQ606193, beaten off the fungus *Stereum* (*hirsutum*?) on dead oak bough 31.x.1999; *Gracilia minuta* (F.) (Cerambycidae), Red Cliff near Sandown, Isle of Wight, SZ619853, swept near patch of brambles *Rubus* sp. on cliff-top, 31.v.1999; **Bruchidius varius* (Olivier) (Chrysomelidae), Red Cliff near Sandown, Isle of Wight, SZ619853, female swept off red clover *Trifolium* growing on cliff-top, 31.v.1999 and Lullingstone Park, W. Kent, TQ5164, female swept off red clover, 16.vi.1999; *Ceutorhynchus parvulus* Brisout (Curculionidae), Bolbery Down, S. Devon, SX6838, male swept off cliff-top grassland, 26.v.1999; **Ceutorhynchus unguicularis* Thomson (Curculionidae), North Hill, Priddy, N. Som., ST5450, three swept in area of rough grassland 12.vi.1999.

KIRBY, P.—Recent captures of uncommon weevils (Curculionidae). *Otiorhynchus raucus* (F.), Cobham Woods, W. Kent, TQ699686, 1.vi.1998; *Caenopsis fissirostris* (Walton), Ashenbank Wood, W. Kent, TQ675693, 16.vi.1998 and East Ruston Common, E. Norf., TG342276, 5.vii.1998; *Trachyphloeus alternans* Gyll., Portland Bill, Dorset, SY677712, 15.ix.1998; *T. asperatus* Boh., Andrews Quarry, Northants, TL060982, 11.v.1999; Portland Bill, Dorset, SY677712, 15.ix.1998 and St Oswald's Bay, Dorset, SY888793, 19.ix.1998; *T. aristatus* (Gyll.), Wansford, A47 road verge, Northants, TF075008, 15.v.1999; *Cathormiocerus maritimus* Rye, Kennack Sands, W. Corn., SW735165, 24.ix.1992; *Omiamima mollina* (Boh.), Sharlston, S.-W.

Yorks., SE374194, 26.v.1995; *Brachysomus echinatus* (Bons.), Devil's Dyke, Cambs., 10.iv.1997; Cobham Woods, W. Kent, TQ699686, 1.vi.1998 and Wansford, A47 road verge, Northants, TF075008, 15.v.1999; *Cneorhinus plumbeus* (Marsh.), East Ruston Common, E. Norf., TG340280, 5.vi.1994; *Hypera diversipunctata* (Schrank), Bubwith Ings, S.-E. Yorks., SE202368, 22.vi.1995 and North Duffield Carrs, S.-E. Yorks., SE695375, 28.vi.1995; *H. meles* (F.), Dibden, S. Hants, SU405092, 19.vi.1999; *Liparus coronatus* (Goeze), Ashenbank Wood, W. Kent, TQ675693, 16.vi.1998; *Leiosoma oblongulum* Boh., Coed y Cerrig NNR, Mon., SO293212, 18-24.x.1997; *Plinthus caliginosus* (F.), Ashenbank Wood, W. Kent, TQ675693, 16.vi.1998 and Cobham Woods, W. Kent, TQ699686, 1.vi.1998; *Gronops lunatus* (F.), Leziate, W. Norf., TF673192, 13.vi.1999; Portland Bill, Dorset, SY677712, 15.ix.1998; East Ruston Common, E. Norf., TG340280, 19.vii.1998 and Andrews Quarry, Northants, TL060982, 11.v.1999; *Magdalis barbicornis* (Latr.), Chedglow Manor Farm, Wilts., ST937930, 23.vi.1999; *M. carbonaria* (L.), Merthyr Tydfil, Glam., SO0404, 5.vi.1997; *M. cerasi* (L.), East Ruston Common, E. Norf., TG340280, 5.vi.1994; *Trachodes hispidus* (L.), Cobham Woods, W. Kent, TQ699686, 1.vi.1998; *Cryptorhynchus lapathi* (L.), East Ruston Common, E. Norf., TG342276, 21.vi.1996 and Ferry Meadows Country Park, Northants, TL154972, 31.v.1999; *Acalles ptinoides* (Marsh.), Blaegwrach, Glam., SN843073, 18.ix.1996; Skipwith Common, S.-E. Yorks., SE658373, 24.vi.1997; Cobham Woods, W. Kent, TQ699686, 17.ix.1998; Ashenbank Wood, W. Kent, TQ675693, 16.vi.1998 and Ploughman Wood, Notts., SK640468, 24.ix.1998; *A. roboris* Curtis, Kilminorth Woods, E. Corn., SX243539, 12.viii.1999; *Abagous lutulentus* (Gyll.), Merthyr Tydfil, Glam., SO0404, 5.vi.1997; *Bagous subcarinatus* Gyll., Stoke Marshes, W. Kent, TQ853760, 22.vii.1995; *Notaris aethiops* (F.), Kielder Forest pond, Northumber., NY685896, 24.vi.1992; *N. bimaculatus* (F.), Richborough, E. Kent, TR329620, 16.ix.1996; South Thorganby Ings, S.-E. Yorks., SE693405, 18.vi.1996 and Ellerton Ings, S.-E. Yorks., SE697403, 29.vi.1995; *N. scirpi* (F.), Buckden Marina, Hunts., TL213685, 20.v.1999 and Glanstony, Carm., SN40, 16–21.ix.1994; *Grypus equiseti* (F.), Sutton Heath and Bog, Northants, TF089000, 20.iv.1996; East Ruston Common, E. Norf., TG340280, in pitfall trap, vi.1994; Glanstony, Carm., SN40, 16-21.ix.1994 and Havant, S. Hants, SU713050, 14.vi.1994; *Mononychus punctumalbum* (Herbst), Warbarrow, Dorset, SY870796, 13.ix.1998; *Eubrychius velutus* (Beck), Landbeach Marina, Cambs., TL480683, 24.v.1997; *Phytobius leucogaster* (Marsh.), Acle Straight, E. Norf., TG407103-500089, 19 28.v.1995; *Pelenomus olssoni* Israelson, Merthyr Tydfil, Glam., SO0404, 19.vii.1997 *Drupenatus nasturtii* (Germ.), River Colne near Harefield, Herts., TQ043929, 24.iii.1996; *Thamiocolus viduatus* (Gyll.), Buckden Marina, Hunts., TL213685, 31.viii.1999; *Datonychus angulosus* (Boh.), East Cottingwith Ings, S.-E. Yorks., SE697413, 12.vi.1996; *Hadroplontus trimaculatus* (F.), Rookery Farm, Eyke, E. Suff., TM330514, 28.v.1999 and St Oswald's Bay, Dorset, SY888793, 19.ix.1998; *Glocianus punctiger* (Gyll.), Gobions Wood, Herts., TL250035, 6.v.1999; *Ceutorhynchus querceti* (Gyll.), East Ruston Common, E. Norf., TG342276, 7.vi.1996; *C. resedae* (Marsh.), Andrews Quarry, Northants, TL060982, 16.v.1999; Kingsbury Brickpits, Warwick, SP218986, 18.viii.1998; Southorpe Roughs, Northants, TF073032, 23.vii.1997 and Landbeach Marina, Cambs., TL480683, 24.v.1997; *Trichosirocalus barnevillei* (Grenier), Dibden, S. Hants, SU405092, 19.vi.1999 and Greenham Common, Berks., SU5164, 17.vi.1998; *T. dawsoni* (Bris.), Portland Bill, Dorset, SY677712, 15.ix.1998; *T. horridus* (Panz.), Ketton, Leics., SK965055, 19.v.1999; *T. rufulus* (Dufour), Farlington Marsh, S. Hants, SU6804, 21.ix.1998 and Cobham Woods, W. Kent, TQ699686, 7.ix.1998; *Stenocarus ruficornis* (Steph.), Wansford, A47 road verge,

Northants, TF075008, 15.v.1999 and Cobham Woods, W. Kent, TQ699686, 7.ix.1998; *Baris lepidii* Germ., Erewash Meadows, Derbys, SK446500, in pitfall trap, v.1998; *B. picicornis* (Marsh.), Beeby's Pit, Hunts., TL192928, 9.v.1998; *Curculio betulae* (Stephens), Bretton, Peterborough, Northants, TF164100, 3.viii.1994 and Blaenclairch, Glam., SN973050, 17.vii.1997; *C. rubidus* (Gyll.), Sandy Heath, Beds., TL204492, 15.ix.1996 and Skipwith Common, S.-E. Yorks., SE658373, 24.vi.1997; *C. villosus* F., Hainault Forest, S. Essex, TQ480940, 28.iv.1999; *Tychius pusillus* Germ., Dibden, S. Hants, SU405092, 19.vi.1999; *Sibinia arenariae* Steph., Dibden, S. Hants, SU405092, 13.v.1999; Lantic Bay, E. Corn., SX147508, 11.viii.1999; Farlington Marsh, S. Hants, SU6804, 21.ix.1998 and Stoke Marshes, W. Kent, TQ853760, 22.vii.1995; *S. primitus* (Herbs), Dibden, S. Hants, SU405092, 1.ix.1999 and Leziate, W. Norf., TF673192, 13.vi.1999; *Mecinus circulatus* (Marsh.), Dibden, S. Hants, SU405092, 19.vi.1999; *M. janthinus* Germ., Cobham Woods, W. Kent, TQ699686, 1.vi.1998 and Wansford, A47 road verge, Northants, TF075008, 15.v.1999; *Gymnetron beccabungae* (L.), Merthyr Tydfil, Glam., SO0404, 5.vi.1997; *G. veronicae* (Germ.), Andrews Quarry, Northants, TL060982, 11.v.1999; Gobions Wood, Herts., TL250035, 6.v.1999; Kenfig Hill, Glam., SN843842, 4.vi.1997; South Thorganby Ings, S.-E. Yorks., SE693405, 18.vi.1996 and Manor Park Gravel Pits, Staffs., SK110170, 2.vi.1997.

KNILL-JONES, S. A.—A specimen of *Amphimallon solstitialis* (L.) (Scarabaeidae), Freshwater, Isle of Wight., mv light, 4.vii.1999.

LEWIS, K. C.—Some *Carabus* (Carabidae) collected in 1997 from Bosnia-Herzegovina, Slovakia and Moravia. *Carabus* (*Eucarabus*) *obsoletus* (Sturm), Lubocha, Slovakia, 1 specimen, 1.v 11.vi.1997 and Bukovske vrchy, Slovakia, 3 specimens at 500m, 1.v.–11.vi.1997; *Carabus* (*Eucarabus*) *ullrichi* (Germ.), Travniv, Moravia, 4 specimens, 6.v.–11.vi.1997; *Carabus* (*Moropocarabus*) *scheidleri* (Panz.) *helleri* Gangl., Pouzdfany, Moravia, 2 specimens, 20.vi.–11.vii.1997 and Strani, Moravia, 2 specimens, 20.vi.–11.vii.1997; *Carabus* (*Orinocarabus*) *linnei* (Panz.), Bukovske vrchy, Slovakia, 6 specimens at 500m, 1.v.–11.vi.1997; *Carabus* (*Pachystus*) *hungaricus* (F.) *viennensis* (Kr.), Pouzdfany, Moravia, 3 specimens, 6.viii.–27.viii.1997; *Carabus* (*Platycarabus*) *irregularis* (F.) *montanandoni* Buysson, Mala, Fatra, Slovakia, 2 specimens at 1000m, 31.vii.–1.viii.1997.

LOTT, D. A.—(1) Terrestrial beetles collected in 1999 from 36 wetland sites in the New Forest, S. Hants. *Pterostichus anthracinus* (Panz.) (Carabidae), Little Wooton Ponds, 12.vii.1999; *Stenolophus skrimshiranus* Steph. (Carabidae), pond at Brown Loaf, 12.vii.1999; *Acupalpus exiguus* Dejean (Carabidae), Beaulieu River, 20.v.1999; *Badister dilatatus* Chaud. (Carabidae), Little Wooton Ponds, 12.vii.1999; *Demetrias monostigma* Samouelle (Carabidae), Avon Water, 24.iv.1999; *Stenus longitarsis* Thoms. (Staphylinidae), Ocknell Plain, 25.iv.1999 and Warwick Slade, 22.v.1999; *S. argus* Grav. (Staphylinidae), Beaulieu River, 20.v.1999; *S. europaeus* Puthz (Staphylinidae), Denny Lodge, 13.vii.1999; *S. kiesenwetteri* (Rosenh.) (Staphylinidae), from 5 sites; *Paederus caligatus* Er. (Staphylinidae), from 11 sites; *P. fuscipes* Curtis (Staphylinidae), from 7 sites; *Gabrius keysianus* Sharp (Staphylinidae), pond at Brown Loaf, 12.vii.1999; *G. velox* Sharp (Staphylinidae), from 2 sites; *Quedius plancus* Er. (Staphylinidae), from 2 sites; *Acylophorus glaberrimus* (Herbs) (Staphylinidae), from 4 sites; *Myllaena kraatzi* Sharp (Staphylinidae), from 11 sites; *Calodera riparia* Er. (Staphylinidae), Bramble Hill, 22.v.1999; *Bibloplectus ambiguus* Redtenb. (Pselaphidae), Cadnam Bog, 26.iv.1999; *Longitarsus nigerrimus* (Gyll.) (Chrysomelidae), Withycombe Slade, 22.ix.1999; *Chaetocnema subcaerulea* Kuts. (Chrysomelidae).

(2) Other beetles collected from the New Forest, S. Hants in 1999. *Epierus comptus* (Er.) (Histeridae), Mark Ash Wood, 17.ix.1999; *Ptenidium brenskei* Flach (Ptiliidae),

Highland Water, 22.v.1999; *P. turgidum* Thoms. (Ptiliidae), Denny Wood, 18.ix.1999; *Meotica exillima* Sharp (Staphylinidae), Highland Water, 22.v.1999; *Acalles ptinoides* (Marsh.) (Curculionidae), Cadnum Bog, 26.iv.1999 and Mark Ash Wood, 17.ix.1999.

(3) Beetles collected in August 1999 from the French Alps. *Nebria jockischi* Sturm (Carabidae), Htes Alpes, La Grave, R Romanche, 1456m, 25.viii.1999; *N. picicornis* (F.) and *Bembidion varicolor* (F.) (Carabidae), Htes Alpes, La Grave, R Romanche, 1450m, 26.viii.1999; *B. complanatum* Heer (Carabidae), Htes Alpes, Villar d'Arene, R Romanche, 1990m, 22.viii.1999; *Omalium xambeui* Fauvel (Staphylinidae), Savoie, Pres du Galibier, marmot burrow 2300m; *Thinobius crinifer* Smetana (Staphylinidae), Htes Alpes, La Grave, Le Maurian Torrent, 1440m, 25.viii.1999; *Philonthus coracion* Peyer. (Staphylinidae), Savoie, Col du Galibier, 2460m, 20.viii.1999 and Isere Besse. Le Rif Tort, 2200m, 24.viii.1999.

MANN, D. J.—(1) Winter breeding *Aphodius* (Scarabaeidae) including a species not previously recognised in Britain. There are eight *Aphodius* species that are active throughout the winter months; of these, 50% have status in the review of scarce and threatened Coleoptera (Hyman, P. S. (Revised Parsons, M. S.) 1992 UK Nature Conservation No. 3: A review of the scarce and threatened Coleoptera of Great Britain part 1: JNCC, Peterborough). However, it is possible that these species are more widespread than the literature suggest and are merely under-recorded due to lack of interest in dung beetle work during the winter months by coleopterists. Species exhibited were: *Aphodius contaminatus* (Herbst), *Aphodius obliteratus* Panzer, *Aphodius consputus* Creutz, *Aphodius prodromus* (Brahm), *Aphodius sphacelatus* (Panzer), *Aphodius conspurcatus* (L.), *Aphodius distinctus* (O. F. Müller), and *Aphodius punctatosulcatus* Sturm. Specimens of this hitherto unknown British species were found in the Collections of Liverpool Museum Hope Entomological Collections, Oxford and the National Museum and Galleries of Wales, Cardiff (a paper on this species in Britain is currently in preparation).

(2) A recent capture of *Psammodius* (*Brindalus*) *porcicollis* (Ill.) (Scarabaeidae: Aphodiinae). *P. porcicollis* has been not been recorded in the entomological literature since 1897, although a dubious record exists for 1989. This year a total of six specimens have been taken at Whitsand Bay, E. Corn. (SX35) by Roger Booth and Darren Mann (Mann & Booth in press).

This rare species of scarab is restricted to small areas of banked sand at the base of cliffs, and less than eighty specimens have ever been taken since its addition to the British list in 1865, all from the same locality. This species requires further study to ascertain the threats to its future conservation status.

MENZIES, I. S. (1) Some notable Coleoptera from Surrey. *Philonthus spinipes* Sharp (Staphylinidae), Bookham Common, Surrey, TQ122562, 5 specimens extracted from horse dung, 27.x.1999; *Clitostethus arcuatus* (Rossi) (Coccinellidae), Bookham Common, Surrey, by beating honeysuckle growing around a shaded birch trunk, 21.ix.1999 and 18.x.1999; *Aromia moschata* (L.) (Cerambycidae), Teddington Lock, Middx, TQ167717, in sun on leaves of osiers on north side of Teddington Lock, 21.viii.1947 (at this time the osiers growing along the margins of gravel pits at Ham were heavily infested with larvae of *A. moschata* and *Cossus cossus* (L.) (Lepidoptera: Cossidae)) and Bolder Mere, Surrey, TQ079584, flying in sun, 11.vii.1999; *Arhopalus tristis* (F.) (Cerambycidae): Ferring-by-Sea, W. Sussex, TQ095016, flying in sun in garden around stack of pine stakes, 4.viii.1947; Surbiton, Surrey, TQ185677, one found resting on wall of Villiers Lodge, 3.ix.1999; *Arhopalus rusticus* (L.) (Cerambycidae), Oxshott Common, Surrey, from pine stumps, 25.vii.1986 (exhibited for comparison with *A. tristis*); *Platystomos albinus* (L.)

(Anthribidae), Wisley Common, Surrey, TQ069590, male beaten off birch sapling, 1.viii.1993 and TQ068587, on pile of fungus-infected sweet chestnut logs, 1.v.1999.

(2) Coleoptera collected in Belize in Dec. 1998. Cerambycidae (determined by R. G. Booth): *Stenodontes molarius* (Bates), Pook's Hill, Belmopan, at light, 20.xii.1998; *Steirastoma senex* White, Pook's Hill, Belmopan, at light, 17.xii.1998 and Fallen Stones, at light, 19.xii.1998; *Oncideres* sp., Pook's Hill, at light; Chrysomelidae (determined by M. L. Cox): *Leptinotarsa undecimlineata* (Stal.), Fallen Stones, on *Solanum* sp., 17.xii.1998; *Zygogramma bigenera* Stal., Pook's Hill, on flowering shrub, 19.xii.1998; *Lema plumbea* Chev., Pook's Hill, on vegetation, 6.xii.1998; *Lema ?dilaticollis* Jac., Las Cuevas, at light, 8.xii.1998; *Colaspis hypochlora* Lafei, Pook's Hill, at light, 20.xii.1998; *C. compta* Lafei, Pook's Hill, at light, 6.xii.1998; *Colaspis* sp., Rio Brava, at light, 13.xii.1998; *Nodonota*, 2 sp., Pook's Hill, at light, 6.xii.1998; *Diabrotica balteata* Le C., Las Cuevas, at light, 8.xii.1998; *Diabrotica*, 3 sp., Pook's Hill, at light, 19.xii.1998; *Homophaeta aequinoctialis* (L.), Fallen Stones, on vegetation, 17.xii.1998; *Asphaera abbreviata* (F.), Las Cuevas, at light, 8.xii.1998; *Oedionychus* sp., and *Exora encaustica* (Germ.), Pook's Hill, at light, 6.xii.1998; *Ophraella dilatipennis* (Jac.), Belmopan, on wall of admin block, 21.xii.1998; *Disonycha brunneofasciata* Jac., Fallen Stones, on vegetation, 17.xii.1998; *Lysathia* sp. and ?*Megasus* sp., Las Cuevas, at light, 8.xii.1998; ?*Syphraea* sp., ?*Pseudogona* sp. and *Mesomphalia punicae* Boh., Pook's Hill, at light, 6.xii.1998; Silphidae (determined by R. G. Booth): *Oxelytrum discicolle* (Brullé), Pook's Hill, at light, 6.xii.1998; Lampyridae: 4 unidentified species; Lycidae: 4 unidentified species; *Clavicornia* (determined by R. G. Booth): *Aegithus rufipennis* Cher., Fallen Stones, in forest clearing, 17.xii.1998; *Cycloneda sanguinea* (L.), Pook's Hill, at light, 19.xii.1998; *Epilachna discincta* Weise (Coccinellidae), Fallen Stones, on vegetation, 17.xii.1998; Rynchophora (determined by M. L. Cox and R. T. Thompson): *Rhynchophorus palmarum* (L.), Pook's Hill, on fruit bait, 6.xii.1998; *Ptychoderes rugicollis* Jordan, Pook's Hill, at light, 6.xii.1998; *Heilus bioculatus* (Boh.), Fallen Stones, in forest clearing, 17.xii.1998; *Macromerus numenius* Er., Pook's Hill, at light, 19.xii.1998; *Ambates solani* Champion, Pook's Hill, at light, 6.xii.1998; Tenebrionidae (determined by R. G. Booth): *Zophobas tridentatus* Kr., Pook's Hill, at light, 19.xii.1998.

OWEN, J. A. *Cryptocephalus coryli* (L.) (Chrysomelidae), together with photographs illustrating its early stages.

SALISBURY, A.—The Royal Horticultural Society's members advisory service. (1) Garden pests: the garden and Welsh chafers *Phyllopertha horticola* (L.) and *Hoplia philanthus* (Fuess.) (Scarabaeidae) cause damage to turf root systems; the May bug and summer chafer *Melolontha melolontha* (L.) and *Amphimallon solstitialis* (L.) (Scarabaeidae), larvae cause damage to plant roots; a pollen beetle *Meligethes aeneus* (F.) (Nitidulidae) found in gardens in large numbers, not a pest as such, but when introduced indoors with cut flowers it can be a nuisance; the raspberry beetle *Byturus tomentosus* (Deg.) (Byturidae), larvae can seriously reduce the quality of raspberry and other cane fruits; the asparagus beetle *Crioceris asparagi* (L.) (Chrysomelidae), both adults and larvae feed on young shoots and foliage; the lily beetle *Lilioceris lilii* (Scop.) (Chrysomelidae), Chobham, Surrey, 1940 (G. F. Wilson), attacks and defoliates lilies and fritillaries; The Colorado beetle *Leptinotarsa decemlineata* Say (Chrysomelidae), France, 1999 (collected by an RHS member), a rare pest of potatoes; the rosemary beetle *Chrysolina americana* (L.) (Chrysomelidae), Oatlands Park, Weybridge, Surrey, 1999, a recent colonist in Britain which attacks the foliage of lavender and rosemary; the mint beetle *Chrysolina menthastri* (Suff.) (Chrysomelidae), occasionally reported causing damage to mint in gardens; the *Lythrum* beetle *Galerucella calmariensis* (L.)

(Chrysomelidae), both adults and larvae feed on the foliage of purple loosestrife *Lythrum salicaria*; the water lily beetle *G. nymphaeae* (L.) (Chrysomelidae), causes damage to water lily leaves; the viburnum beetle *Pyrrhalta viburni* (Payk.) (Chrysomelidae), causes defoliation of both native and introduced *Viburnum* species; *Lavatera* flea beetle *Podagrica fuscicornis* (L.) (Chrysomelidae), Langley Vale, Surrey, vii.1999, occasionally reported causing damage to shrubby *Lavatera* in gardens; the vine weevil *Otiorhynchus sulcatus* (F.) (Curculionidae), larvae consume the roots of potted plants and the adults notch leaves; figwort weevils *Cionus scrophulariae* (L.) and *Cleopus pulchellus* (Herbs) (Curculionidae), both adults and larvae cause damage to flowers and shoot tips of *Scrophularia*, *Buddleja*, *Phygelius* and *Verbascum* species.

(2) Indoor pests: a powder post beetle *Lyctus brunneus* (Steph.) (Lyctidae), Middlewich, Ches., v.1999, potentially a serious pest of seasoned hardwood timber; the larder beetle *Dermestes lardarius* L. (Dermestidae), often found in bags of organic manure derived from deep litter poultry houses, which usually contains some carcass material; the biscuit beetle *Stegobium paniceum* (L.) (Anobiidae), a common species, found in almost any dried vegetable matter, including dog biscuits and slug pellets; Australian spider beetle *Ptinus tectus* Boield. (Ptinidae), Harlech, Merion., in RHS member's house, a pest of stored food products; the rice weevil *Sitophilus oryzae* (L.) (Curculionidae), Lyne, Surrey, x.1998, found infrequently in rice.

(3) Enquiries about species that are not pests: a common ground beetle *Pterostichus madidus* (F.) (Carabidae) and the devil's coach horse *Ocypus olens* (Müll.) (Staphylinidae), frequently found both in the garden and indoors. The stag beetle *Lucanus cervus* (L.) (Lucanidae), Southcote, Reading, Berks., specimen received dead, vi.1999. Recent publicity by the People's Trust for Endangered Species has increased interest in this dead-wood species; the rose chafer *Cetonia aurata* (L.) (Scarabaeidae), Sunningdale, Berks., a specimen, thought to be a vine weevil, was found in a garden, iv.1999. Larvae often occur in garden compost heaps. A woodworm beetle *Ptinomorphus imperialis* (L.) (Anobiidae), Lyndhurst, S. Hants, viii.1999, found by a RHS member in its pupal case in a dead wisteria branch. The wasp beetle *Clytus arietis* (L.) (Cerambycidae), often found inside dead wisteria branches. A longhorn beetle *Phymatodes testaceus* (L.) (Cerambycidae), often emerges from firewood in the house.

(4) Live adults and larvae of *Chrysolina americana* L. (Chrysomelidae), the rosemary beetle. Adult beetles were brought to a bug identification day at the RHS Garden, Wisley, on 27.vi.1999, from a garden in Oatlands Park, Weybridge, Surrey, as a pest on rosemary *Rosmarinus officinalis*. This is the first record of this beetle as a pest in a private garden seen by RHS advisors.

TELFER, M. G. (1) Some beetles collected by MGT and H. R. Arnold at Monks Wood, Hunts., 26.v.1999, by sweeping grassy ride-edges at lunchtimes: *Badister unipustulatus* Bonelli (Carabidae), first record for Monks Wood; *Tillus elongatus* (L.) (Cleridae); *Agrilus pannonicus* (Pill. & Mitt.) (Buprestidae); *Malthodes frontalis* (Marsh.) (Cantharidae); *Lissodema quadripustulata* (Marsh.) (Salpingidae), an extraordinarily deformed specimen with a process on the right hand side of its prosternum; *Conopalpus testaceus* (Ol.) (Melandryidae); *Acalles roboris* Curtis (Curculionidae); *Coeliodes ruber* (Marsh.) (Curculionidae).

(2) Beetles collected by MGT and B.C. Eversham on Ouse Washes, 12.iv.1998: *Bradycellus csikii* Laczó (Carabidae), three specimens found together sheltering under a dock leaf after the Easter 1998 floods.

(3) Beetles collected by MGT and B.C. Eversham on Deal sandhills, E. Kent, 12.vi.1999: *Amara spreta* Dejean, *Harpalus serripes* (Quens.), *Ophonus puncticeps*

(Steph.) (Carabidae), a very small male; *Melanotus punctolineatus* (Pelerin) (Elateridae), one of four males flying around horse-radish in the rough of the golf course and *Platynaspis luteorubra* (Goeze) (Coccinellidae).

(4) Beetles collected by MGT and B.C. Eversham on Walland Marsh, E. Kent, 11.vi.1999: *Amara strenua* Zimm., *Stenolophus skrimshiranus* Steph., *Badister collaris* Mots., *B. unipustulatus* Bonelli and *Odacantha melanura* (L.) (Carabidae).

(5) Beetles collected by MGT and B.C. Eversham on Shetland, 9–18.vii.1999: *Pelophila borealis* (Payk.) (Carabidae); *Notiophilus aestuans* (Mots.) (Carabidae), the Keen of Hamar NNR, Unst; *Trechus fulvus* Dejean, (Carabidae), Quarff, mainland, two found together under a large rock near high water mark on a gravel beach; *Pterostichus rhaeticus* Heer (Carabidae), first Shetland record; *Calathus melanocephalus* (L.) (Carabidae), first Shetland record.

(6) Beetles collected by MGT and B.C. Eversham at Dungeness, E. Kent, 4.v.1998: *Tachys bistriatus* (Duft.) (Carabidae), det. P. M. Hammond, 2000, a single specimen from cracked hard clay beside a gravel pit [exhibited as *T. micros* (Fischer von Waldheim)]; *Bembidion decorum* (Zenk. in Panz.), common on gravel pit margins, the first Kent record, initially found and identified by BCE.

Hemiptera

Alexander, K. N. A.—A selection of the more interesting bugs encountered during 1999: *Geotomus punctulatus* (Costa) (Cydnidae), RDB1, and *Emblethis griseus* (Wolff) (Lygaeidae) RDB3, both from Tredra Cliff, Whitesand Bay, W. Cornwall, in loose sand, 5.v.1999; *Pterotmetus staphyliniformis* (Schilling) (Lygaeidae), RDB3, Boscregan Cliff, W. Cornwall, under heather mat on outcrop, 5.v.1999; *Pilophorus perplexus* (Douglas & Scott) (Miridae), Forthampton Oaks, W. Glos., on oak foliage with *Lasius brunneus* ants, 14.viii. 1999, new county record.

Badmin, J. S.—*Cixius remotus* Edwards (Cixiidae): an exhibit of a survey of this species at Dungeness NNR, Kent.

Bowdrey, J.—*Spathocera dahlmanni* (Schilling) (Coreidae), Notable A, Middlewick Ranges, Colchester, Essex, TM0022, 24.viii.1999, taken in vacuum samples on bare sandy ground with *Rumex acetosella*, a sizeable colony, only one previous Essex record.

Gibbs, D. J.—*Macroplax preyssleri* (Fieber) (Lygaeidae), RDB3, Goblin Combe, Somerset, ST4765, 9.vi.1999, new site for this species, which is confined to Glos., Somerset and Glamorgan. *Rhyparochromus pini* (L.) (Lygaeidae), Notable B, Goblin Combe, Somerset, ST4765, 9.vi.1999 and Dolebury Warren, Somerset, ST4558, 19.viii.1999, local status unknown.

Hodge, P. J. –*Drymus pumilio* Puton (Lygaeidae), Notable B, Happy Valley, Coulsdon, Surrey, TQ302571, 2.ix.1999, one swept.

Hodge, P. J., Salmon, M. A. & Stewart, A. J. A.—An exhibit of various specimens of an unusual variant of *Issus coleoptratus* (Geoffroy) (Issidae) displaying single broad black longitudinal bands on each elytron; Roydon Wood, New Forest, Hants, SU316012, 1.viii.1998, col. M. A. Salmon; Pound Common, Woolbeding, W. Sussex, SU867246, 7.ix.1997, two specimens beaten from ivy-covered oak, coll P. J. Hodge; a specimen of the typical form, Alice Holt Forest, Hants, SU806405, viii.1997, taken in Malaise trap, Forestry Commission survey, det. A. J. A. Stewart.

Knill-Jones, S. –*Ledra aurita* (l.) (Cicadellidae). Freshwater, Isle of Wight, 25.viii.1999, at mv light.

NAU, B.—An exhibit of draft keys to British water bugs, Saldidae, and plant bugs, Miridae; including photographs of some shield bugs which can be confused, and draft distribution maps of shield bugs and allies.

HYMENOPTERA

ARCHER, M.—(a) Some British aculeate bees and wasps taken in 1998 and 1999. Tiphiidae: *Tiphia minuta* Vander Linden, vi.98, Leicester – a new county record for Leics. Pompilidae: *Evagetes dubius* (Vander Linden), 28.viii.98, Roydon Common, Norf. Eumenidae: *Eumenes papillarius* (Christ), 30.vii.99, a vagrant species found at York Cemetery, Yorks. Vespidae: *Dolichovespula saxonica* (F.), 15 & 16.viii.99, Beningbrough Hall, Yorks—new to the county. Sphecidae: *Crossocerus distinguendus* (Morawitz), vii.98, Leicester—new to the county; *C. binotatus* Lepeletier & Brullé, 25.vii.98, Stutton, Yorks; *Cerceris quinquefasciata* (Rossius), 28.viii.98, Roydon Common, Norf.; *Philanthus triangulum* (F.), 6.viii.98, Gentleshaw Common, Staffs. Apidae: *Colletes hederae* Schmidt & Westrich, 7 & 9.ix.98, Guernsey; *Hylaeus signatus* (Panz.), 2.vii.98, York Cemetery, Yorks; *Andrena tibialis* (Kirby), 27.iv.98, Sandall Beat Wood, S. Yorks; *A. bimaculata* (Kirby), 7.viii.98, Highgate Common, Staffs and 28.iii.98, Ampthill, Beds; *Lasioglossum pauxillum* (Schr.), 10.v.98, Shedfield Common, Hants; *Hoplitis spinulosa* (Kirby), 18.viii.98, Burdale, E. Yorks—new to the county; *Nomada pleurosticta* H.-S., 4.vii.98, Brayton Barff, S. Yorks.

(b) Some aculeate bees and wasps from Italy, France and Crete. Scoliidae: *Megascolia flavifrons* (F.), 8.vi.99, Lucca, Tuscany, Italy; *Scolia hirta* (Schr.), 20.viii.79, le Corisie, Loire-Atlantique, France and 18.vi.99, Montecatini Alto, Florence, Tuscany, Italy. Apidae: *Chalicodoma sicula* Rossi, 2.iv.88, Makryalos, Crete and 31.iii.88, near Anatoli, Crete; *Anthidium interruptum* (F.), 19.viii.87, Dirac, Angoulême, Charente, France; *A. septemspinosum* Lepeletier, 2.viii.90, Pissos, Landes, France; *A. florentium* (F.), 22.viii.73, Avignon, Vaucluse, France; *A. oblongatum* (Ill.), 18.vii.95, Lac du Bouche, Haute-Loire, France; *A. punctatum* Lat., 15 & 21.vii.95, Pont d'Alleyras, Haute-Loire, France; *A. strigatum* (Panz.), 5.viii.90, near Luxey, Landes, France; *A. manicatum* (L.), 26.vii.90, Forêt de Fougères, Ille-et-Vilane, France and 14.viii.93, St Cernin de l'Herm, Dordogne, France; *A. lituratum* (Panz.), 8.viii.93, near Soulaures, Dordogne, France; *A. loti* Perris, 2.viii.90, Pissos, Landes, France; *Sphecodes albilabris* (F.), 16.viii.98, Vorey, Haute-Loire, France and 2.viii.75, Contouville, Manche, France; *S. alternatus* Smith, 13.iv.96, Songia, Crete; *S. marginatus* von Hagens, 15.v.98, Pontempeyrat, Haute-Loire, France.

BALDOCK, D. W. & COLLINS, G. A. An exhibit based on the recording of aculeate hymenoptera in Surrey (VC 17) for a forthcoming publication in the "Surrey Atlas" series. Despite the amount of historical recording, several species new to Surrey have been found and many species thought to be uncommon have been found to occur quite widely. The species exhibited were arranged in three categories: those that are nationally rare; those that have RDB status but are quite widespread in Surrey; and those that are recently established in the county and spreading. The rare species shown were Pompilidae: *Ceropales variegata* (F.), col. J. P. Brock, 16.vii – 9.viii.99, Thursley Common – this rare spider wasp had been unrecorded in Britain since 1955 and 1902 in Surrey. It was found in reasonable numbers by Malaise trapping but not found by direct observation. Eumenidae: *Symmorphus crassicornis* (Panz.), col. D.W.B., 11.vii.99, Bagmoor Common and col. G.A.C., 9.vii.99, Arbrook Common; *S. connexus* (Curt.), col. D.W.B., 15.vii.99, Bagmoor Common and 12.vii.99, Mare Hill Common. Both *Symmorphus* spp. were flying round the foliage of aspen on which the chrysomelid beetle *Chrysomela populi* L. was feeding.

Chrysididae: *Chrysis fulgida* L., col. D.W.B., 15.vi.99, Mare Hill Common. This RDB1 cuckoo wasp may be a cleptoparasite of *Symmorphus crassicornis*. Sphecidae: *Crossocerus vagabundus* (Panz.), col. D.W.B., 13.vii.99, Bagmoor Common. A RDB1 species that was formerly widespread but thought to have gone from Britain in the 1950s. It has recently been rediscovered in Hants and now in Surrey. Apidae: *Hylaeus pectoralis* Först., col. G.A.C., 1995, Esher Common. Nationally, this is a local bee that nests in the galls of the chloropid fly, *Lipara lucens* Mg. on common reed and occurs widely in East Anglia and Hants. There are now two sites in Surrey. *Andrena proxima* (Kirby), col. D.W.B., 9.vi.99, The Sheepleas, near West Horsley. A rare mining bee that seems to have declined recently, at least inland. There are several recent records from central Surrey. *Nomada lathburiana* (Kirby), col. G.A.C., 8.iv.99, Richmond. A rare bee parasitic on the nests of *Andrena cineraria* (L.), which itself is very local in Surrey. Extremely large numbers (10,000+) of the host bee were seen with numerous examples of *N. lathburiana*. Distribution maps were shown of four "not so rare" species which have RDB status but are fairly widespread in Surrey. These are the bees *Andrena florea* F., *Sphecodes niger* Sichel, *Nomada fulvicornis* F. and *Ceratina cyanea* (Kirby). "New" species known from Surrey only in the 20th century and which are probably spreading are the sphecid wasps *Passaloecus eremita* Kohl and *Ectemnius borealis* (Zett.), and the bee *Stelis breviuscula* (Nylander) and its host bee *Heriades truncorum* (L.). Anyone with records of Surrey aculeate hymenoptera should contact David Baldock, Nightingales, Haslemere Road, Milford, Surrey, GU8 5DA.

COLLINS, G. A.—A specimen of *Pamphilius latifrons* (Fall.) (Hym: Pamphiliidae), taken 8.vi.99 at Foyle Riding, Limpsfield, Surrey. This appears to be only the second post-1970 record of a pamphiliid sawfly that has larvae that feed within rolled aspen leaves.

GIBBS, D.—Some solitary bees recorded in 1999 from Somerset. Apidae: *Andrena proxima* (Kirby), 25.v.99, from an old railway cutting at Radstock Sidings, Som.; *A. marginata* F., 21.viii.99, on devils-bit scabious, Tucking Mill, Som.; *Stelis ornatula* (Klug), 25.v.99, Radstock Sidings and 11.vi.99, Dolebury Warren, Som.—taken from warm sheltered spots in dry grassland, probably the first records for Avon; *Eucera longicornis* (L.), 2.vi.99, on red clover flowers, Blake's Pools, Som.; *Ceratina cyanea* (Kirby), 25.v.99, Radstock Sidings, Som.—there are several good colonies along the old railway line, these are the only Avon records for about 100 years; *Nomada conjungens* H.-S., 16.v.99, Radstock Sidings and 3.vii.99, Tucking Mill, Som.—both specimens of this RDB2 bee were from old railway cuttings and are the only Avon records; *N. hirtipes* Perez, 3.v.99, from calcareous grassland at Dolebury Warren and 16.v.99, Goblin Combe, Som.; *N. lathburiana* (Kirby), 6.iv.99, Troopers Hill, Bristol.

HALSTEAD, A. J.—Some scarce or local sawflies and sphecid wasps taken in 1999. Tenthredinidae: female *Protoemphytus perla* (Klug), 5.viii.99 and female *Caliroa cinxia* (Klug), 23.vii.99, both swept from a wooded river bank at RHS Garden, Wisley, Surrey; female *Periclista albida* (Klug), 25.iv.99, swept from oak, Newlands Corner, Surrey; *Metallus pumilus* (Klug), male 1.v.99, female 10.v.99, bred from larvae in leaf mines on raspberry, Brookwood, Surrey; female *Amauronematus puniceus* (Christ), 16.v.99, on aspen shoot, Chobham Common, Surrey. Sphecidae: male *Astata pinguis* (Dahlbom), 15.vi.99, netted in sand dunes, Sandscale Haws, near Dalton in Furness, Cumbria; male *Crossocerus palmipes* (L.), 11.vii.99, swept from dry heathland, Greyspot Hill, Brentmoor Heath, near West End, Surrey; female *C. styrius* (Kohl), 25.ix.99, swept in a deciduous wood, Moor Copse, near Tidmarsh, Berks.

HARVEY, M.—Two local solitary bees from VC Berkshire. Apidae: female *Melitta tricincta* (Kirby), 30.vii.99, at flowers of red bartsia, *Odontites vernus* (the bee is believed to be dependent on the pollen of this flower), at Mowbray Fields, a proposed local nature reserve south of Didcot in the modern county of Oxfordshire. This record slightly extends to the north west the range of this bee and seems to be the first record for modern Oxfordshire; there are previous records for VC Berkshire. *Andrena labiata* F., 6.vi.99, from the exhibitor's garden, Upper Basildon, Berks.

HAWKINS, R. D.—Some aculeate hymenoptera and a wood wasp taken in recent years in Surrey. Siricidae: female *Urocerus gigas* (L.), 26.vi.99, killed by a woodworker's boot while investigating a van-load of logs at Farthing Down, Coulsdon. Formicidae: *Ponera coarctata* (Lat.), 28.ix.99, sieved from moss on chalk spoil and *Myrmecina graminicola* (Lat.), 30.ix.99, a winged female from chalk grassland on the lip of a quarry, both at Betchworth Quarry. Eumenidae: *Symmorphus connexus* (Curt.), 4.vii.98 at root plate of fallen pine, Bagmoor Common. Apidae: male *Lasioglossum xanthopus* (Kirby), 11.x.99 on *Knautia arvensis* flower, Happy Valley, Coulsdon; female *Andrena ferox* Smith, F., 11.v.98 flying over short turf at Reigate Heath; female *A. marginata* F., 19.viii.99, on *Scabiosa columbaria* flower, Farthing Down, Coulsdon; female *A. cineraria* (L.), 3.v.97, at nest holes in sandy ground, Ham Common; *Nomada lathburiana* (Kirby), a nest parasite found in company with the preceding species.

HODGE, P. J.—Two solitary bees and a spider wasp from Surrey. Apidae: female *Andrena hattorfiana* (F.), 9.vii.99, swept from flowers of field scabious, *Knautia arvensis*, Happy Valley, Coulsdon; female *A. marginata* F., 4.viii.99, flying over scabious flowers, Farthing Down, Coulsdon. Pompilidae: female *Priocnemis agilis* (Shuck.), 9.vii.99, on hogweed umbel, Happy Valley, Coulsdon.

MCNAMARA, D. S. K.—Several specimens of a large and as yet unidentified wasp of the Scoliidae family collected in Banos, Ecuador in 1996.

PARFITT, R. W.—A male wasp, *Polistes* sp. (Vespidae) found in a greengrocer's shop at Saltash, Cornwall on 19.xi.99.

UFFEN, R. W. J.—Some new and locally rare solitary bees and wasps recorded in 1999 in Hertfordshire (VC 20), including a sphecid wasp new to Britain. Apidae: *Colletes succinctus* (L.), 21.viii.99 at Nomansland Common, Wheathampstead and Gustard Wood Common, 29.viii.99 at Colney Heath Common. *Andrena fuscipes* (Kirby) has been recorded from three permanent *Calluna* sites for five–ten years while *C. succinctus* appeared to be absent. In 1999 it appeared at two of these *fuscipes* sites and both species were found at another, remote site at Colney Heath where heather has regenerated after ploughing in the 1940s. Female *Andrena coitana* (Kirby), 26.vi.99, swept from bramble flowers, Northchurch Common, N.W. Herts. Male *Lasioglossum quadrinotatum* (Kirby), 14.viii.99, swept from a chalk downland path, Therfield Heath, Royston. Two male *Megachile leachella* Curt., 19.vii.99, at 7pm and probably looking for roosting sites, exploring shattered root ends of an oak stump, Colney Heath. This species is generally thought of as a classic coastal dune and Breck species, with only occasional inland records. Sphecidae: New to Britain, a female *Crossocerus congener* Dahlbom, 1.vi.99, exploring woodworm holes in ash trees, Croxley Common Moor, Rickmansworth. It is distinguished from the similar *C. podagricus* (Vander Linden) by the male mid tibia not being foreshortened, and in both sexes by the lack of crenate boundaries on the dorsum of the propodeum. *Crossocerus walkeri* (Shuck.), 25.vi.99, several males and a female on bramble leaves by the River Mimram at Tewinbury SSSI, but no mayfly prey seen; *Psen equestris* (F.), 23.vii.99, Tyttenhanger sandpit, Colney Heath; *Nysson trimaculatus* (Rossius), 23.vii.99, both sexes numerous among a strong colony of *Crossocerus quadrimaculatus* (F.) at Tyttenhanger sandpit. Eumenidae: female *Microdynerus exilis* (H.-S.),

18.vii.99, Tyttenhanger sandpit, Colney Heath. Vespidae: *Dolichovespula saxonica* (F.), 2.viii.99, not new to Hertfordshire but infrequently seen, Frithsden Beeches, Ashridge.

Dermaptera

Gibbs, D.—The earwig, *Forficula lesnei* Finot, 21.viii.99, Tucking Mill, Som. Probably not infrequent but there are few Avon records.

Orthoptera

Gibbs, D.—The grasshopper, *Omocestus rufipes* (Zett.), 19.viii.99, Dolebury Warren, Som. This is one of two colonies now confirmed in the Bristol area.

Neuroptera

Kemp, R. J.—*Nemoptera sinuata* Ol., 20.vi.98, flying in daylight in open scrub habitat at Osminaye on the Nimara Peninsular, S.W. Turkey. Its slow, floppy flight facilitated its capture. This member of the Nemopteridae is closely related to the insect depicted in the BENHS logo.

Illustrations

Harley, B. H. –Illustrations of all species described in Volume 4 of *The Moths and Butterflies of Great Britain and Ireland* (Oeciphoridae to Scythrididae, including Gelechiidae) on 12 colour plates by Richard Lewington, showing finished size. This will be published as early as possible in 2000, the text and illustrations being very nearly completed.

Lewis, K. C.—Two watercolour paintings by Colin Ashford, a member of the Marine and Aviation Watercolour Society, showing two old entomological establishments. Painting number (1) showed the Butterfly Farm that was started by the late Mr. L. W. Newman in Salisbury Road, Old Bexley, Kent. After his death his son, the late Mr. L. H. Newman, continued the farm. The two houses shown in the painting formed the farm and were knocked into one to form one building part farm and part showroom. There was also a glass extension that ran the length of the building at the back; this was used for breeding butterflies and moths, as was the glazed building on the right. Sadly all the buildings were demolished during the 1970s. It's interesting to note as the millennium year approaches that Mr. L. H. Newman bred thousands of butterflies for release at the South Bank Festival of Britain in London. Painting number (2) showed Watkins and Doncaster the Naturalists after its move from the Strand in London. This building was situated at 110 Park View Road, Welling, Kent. The company was then owned by the late Mr. R. L. E. Ford and passed to his son Mr. R. J. Ford and is now located at Hawkhurst. The showroom/house was demolished during the 1970s and a large block of flats now occupies the space. Mr. Lewis carried out a lot of work for the Butterfly Farm and the Naturalists mostly setting butterflies and exotic beetles. Many members at the exhibition would remember visiting both the establishments in their younger days. Both watercolours were painted from 35mm slides taken by Mr. T. J. Lavender.

Revels, R.—A selection of plants, butterflies and ladybirds from his extensive library of photographs.

ERRATA FROM 1998 EXHIBITION REPORT

12:3 p. 182. P.J. Hodge. The chrysid wasps *Chrysogona gracillima* (Foerster) and *Cleptes semiauratus* (L.) were taken at Turkey Brook, Forty Hall, Middlesex and not Surrey as stated.

12:3 p. 186. M.E.A. Shardlow. The starlet sea anemone (Nematostella vectensis) is a saline lagoon species. The record should be amended to read "in lagoons on Havergate Island..."

BENHS INDOOR MEETINGS

13 July 1999

Mr E. PHILP showed a large specimen of a male stag beetle, *Lucanus cervus* (L.) and a distribution map for this species in Kent.

Mr A. J. HALSTEAD showed a live specimen of the bug, *Reduvius personatus* (L.) (Hemiptera: Reduviidae) that was found on a garden fence at his house at Knaphill, Surrey on 8.vii.99. This species is usually found in houses or outbuildings where the adults and nymphs prey on household insects. Although said to be widespread in southern England this 14 mm bug is infrequently seen and presumably requires more specific conditions than simply living in buildings. Mr Halstead also showed some examples of an unidentified exotic ant the size of a worker wood ant. These were taken at the RHS Hampton Court Palace Flower Show on 8.vii.99. One of the exhibitors at the Show, The Palm Centre of Ham, Surrey, was showing some caranday palms, *Trithrinax campestris*. This palm grows in a restricted area of Argentina and is being destroyed as its habitat is converted into agricultural use. Some of these palms, which are frost tolerant, are being imported into the UK for garden use. The trunks are covered with interlocking spines and the remains of old leaf stalks, providing excellent hiding places for invertebrate animals. In addition to the large black ant, a single smaller elongate red ant was seen, plus numerous spider webs of a funnel type, all of which are likely to be exotic species imported with the palm.

It was announced that the Devon Moth Group has been approved as a corporate member by Council.

Dr J. MUGGLETON made a request for anyone who regularly runs a light trap for moths to contact him. The large yellow underwing moth, *Noctua pronuba* L. commonly comes to light in considerable numbers. It occurs in several colour forms and, unusually amongst moths, the ratio of colour forms seem to be constant throughout Britain. There is, however, some evidence to suggest this ratio may be changing and he would like to hear from people who are willing to record the colour forms in their area.

Mr A. J. HALSTEAD reported another established colony of the rosemary leaf beetle, *Chrysolina americana* L. Three specimens of this south European species were found in 1994 at RHS Garden, Wisley, Surrey in circumstances that suggested that it might have bred there; a single specimen was found at Dinton Pastures Country Park on 21.ii.98 and in late summer 1998 adults and larvae were found on lavender at the Shell Building, near Waterloo, London. The latest colony is on rosemary in a private garden at Oatlands Park, Weybridge, Surrey where many adults were found by the owners on 27.vi.99.

Mr G. BOYD reported that he had taken the conifer-feeding yponomeutid moth *Argyresthia trifasciata* (Staudinger) in his garden at Northampton on 1.vi.99.

Mr. D. NAPIER spoke on The Great Stag Hunt in which he described the survey he had undertaken on behalf of the People's Trust for Endangered Species (PTES) into the current distribution of the stag beetle, *Lucanus cervus* (L.). Although this species is of widespread occurrence in Europe it is declining in some areas, especially Denmark, Holland and the northern part of its range in Britain. In 1998 the stag beetle was placed on Schedule 5 under the Wildlife and Countryside Act in order to ban the selling of specimens. Following the Rio Convention on Biodiversity the stag beetle was selected for a biodiversity action plan and was adopted by the PTES. In 1998 the PTES produced a survey leaflet which was distributed through the Wildlife Trusts and other organisations. In addition to seeking information on the beetle's whereabouts the survey also aimed to gather further information on the beetle's biology, behaviour and ecology. Most of the records received were from gardens, parks and streets in urban areas, with countryside areas being poorly represented. The larvae were reported feeding on the dead roots and stumps of a wide range of native and exotic woody plants. Apple, pear and cherry were the most frequently mentioned hosts.

The information received is being processed on to Recorder. This is taking time because of the need to check map references. About 11000 records have been sent in with an average of about two per person. The survey has shown a 1998 distribution that is not very different from the historical record. Most sightings have been east of a line drawn from Suffolk to Dorset, with clusters in Devon and south Wales, and a single record for north Wales. Some of the old northern records were at ports and may have been imports. The hot spots are on the Suffolk/Essex border, south London, north west Surrey, the New Forest, south Dorset and the north Kent coast. Most of the London records are south of the Thames on sandy soils rather than on clay. Further investigations will be made into the link between the beetle's distribution and soil types. Monitoring of the beetle's distribution will continue and records outside the beetle's core area are particularly welcome.

13 September 1999
BENHS/LNHS Joint Meeting

Mr J. THOMPSON of the London Natural History Society was in the chair for the meeting which took place in the rooms of the Linnaean Society at Burlington House, Piccadilly.

Mr R. D. HAWKINS showed two live insects from France, taken on a steep south-facing calcareous slope near the mouth of the River Seine on 29.viii.99. One was the bush cricket *Phaneroptera falcata* (Poda) (Orthoptera: Tettigoniidae). This species has been taken in Cornwall on two occasions about 100 years ago but not since. It was abundant on the French site, which has a similar maritime climate. It feeds on bramble leaves. The other insect was *Drilus flavescens* (L.) (Col: Drilidae). At an earlier BENHS meeting a bristly beetle larva was shown which provoked much discussion as to its identity. It was provisionally named by Dr R. G. Booth as *Drilus flavescens*. It ate a snail offered to it but died before reaching maturity. A similar larva was found in France and from a selection of snails it selected an immature *Cepaea* sp. The larva was shown inside the shell where it had moulted and was showing its smooth curved underside which was visible through the shell.

Mr R. UFFEN showed some aculeate Hymenoptera from Hertfordshire. These included a female sphecid wasp, *Crossocerus congenor* Dahlbom, which is new to

Britain. This was found at Croxley Common Moor, Rickmansworth on 1.vi.99. The similar *Crossocerus podagricus* (Van der Linden) was shown for comparison. Further details of this addition to the British list will be published as a note in the *Journal*. Also shown was a male leaf-cutting bee, *Megachile leachella* Curtis, taken at Tyttenhanger sand pit, Colney Heath on 19.vii.99. This is a dune and Breckland species new to Hertfordshire.

Miss R. DAY showed a photograph of a dragonfly taken by Dr R. Bullock at Barn Elms Reservoir. This is believed to be a migrant species, the lesser emperor, *Anax parthenope*.

Mr A. J. HALSTEAD showed two live immature marsh frogs, *Rana ridibunda* Pallas, collected from near a pool on Wisley Common SSSI, Surrey. This introduced large, greenish frog has spread widely through Surrey during the 1990s, being recorded at RNHS Garden, Wisley since May 1992. Its recent spread may be due to the warmer summers during the 1990s which may have increased its breeding success and hence need to disperse. The adult frogs feed on a wide range of insects and other invertebrates, other amphibians, nesting birds, small mice and fish up to 7 cm long! The increasing abundance of the marsh frog could have serious implications for other wildlife.

Mr S. MILES publicised the Society's Research Fund. He also made available for inspection a pamphlet produced by the Department of Environment, Transport and Regions entitled 'SSSIs—better protection and management: the government's framework for action'.

Miss R. DAY gave the fifth Brad Ashby Memorial Lecture and spoke on the dragonflies of the London area (defined as a circle of 20 miles radius centred on St Paul's Cathedral). Six dragonflies and four damselflies are common in this area. These are the broad-bodied chaser, brown hawker, southern hawker, emperor, common darter, migrant hawker, blue-tailed damsel, common blue damsel, azure damsel and the banded demoiselle. Less common are the black-tailed skimmer, ruddy darter, four-spotted chaser, emerald damsel, large red damsel and the red-eyed damsel. Scarce species are the black darter, downy emerald dragonfly, scarce emerald damsel, hairy dragonfly, brilliant emerald and keeled skimmer. Also recorded in the London area is the nationally scarce white-legged damsel which occurs widely along London's rivers. The variable blue damselfly has been recorded in the past but is probably no longer found. Other species which have been recorded as occasional migrants are the vagrant darter, yellow-winged darter, red-veined darter and the lesser emperor. The last mentioned is known on the strength of a photograph taken at Barn Elms Reservoir and requires confirmation. The best sites for Odonata in the London area are Cornmill Stream, Waltham Abbey; Wake Valley Pond, Epping Forest; Rainham and Wennington Marsh; Richmond Park; Wimbledon Common; Langham Pond, Runnymede; Black Pond, Esher Common; Hampstead Heath; Lavender Pond, Rotherhithe; and Bookham Common. The best sites have up to 17 species. The speaker is Odonata recorder for the London area and she stressed the need for continued monitoring of sites in order to detect changes in the dragonfly fauna which might indicate a deterioration in water quality or site management. Records of common species, even from well known sites, are welcomed in order to keep site lists up to date.

12 October 1999

The President, Mr S. MILES, announced the deaths of Mr R. H. Mays and Mr J. M. Boyd.

Mr D. HACKETT showed a live queen of the social wasp, *Dolichovespula media* (Retzius) which he had found on the front door of his house at Crouch End, London N8.

Mr M. J. BLECKWEN showed some live adults of the rosemary leaf beetle, *Chrysolina americana* L. (Coleoptera: Chrysomelidae) found on rosemary growing in the grounds of the Tate Gallery, London SW1.

It was announced that the following persons have been approved by Council as members: Mr M. E. Blythe, Mr B. Brigden, Mr J. F. H. Cole, Mr A. Crawforth, Mr T. C. Dixon, Mr R. H. Douglas, Mr J. Hunniset, Mr G. Jones, Mr D. A. Lepard, Mr L. E. Marshall, Mr J. McKellar, Mr G. Nobes, Mr M. L. Opie, Mr S. E. Petley, Mr G. B. Summers, Mr A. Walker, Mr J. R. Yarnold.

Mr E. PHILP said that he had recently seen red admiral and speckled wood butterflies, and the bumblebees *Bombus lucorum* (L.) and *B. terrestris* (L.) on the wing in Kent. Dr J. Muggleton reported he had taken Dewick's plusia, *Macdunnoughia confusa* Stephens in a light trap at Staines. This is believed to be the first record for Middlesex. Mr S. Paston had seen the hoverfly *Volucella inanis* (L.) feeding on marjoram flowers in a garden in Norfolk and thought this could be a new county record.

Mr M. EDWARDS spoke on the decline of bumblebees in the UK. Some species of bumblebee appear to have gone into sharp decline in the second half of the twentieth century. Bumblebees were the subject of a mapping scheme in the 1970s but this survey is flawed as it contains many dubious records that lack supporting data or voucher specimens. The Bees, Wasps and Ants Recording Society (BWARS) is currently updating information on the distribution of bumblebees in the British Isles. *Bombus distinguendis* Morawitz, *B. humilis* Illiger, *B. sylvarum* (L.), *B. muscorum* (L.), *B. ruderarius* (Müller), *B. monticola* Smith and *B. jonellus* (Kirby) are all in decline and some have shown a dramatic reduction in distribution. *Bombus subterraneus* (L.) was formerly widespread in England but declined in the 1960s and was last seen at Dungeness, Kent. It has not been found in recent years, despite intensive searches, and is probably extinct in Britain. *Bombus ruderatus* (F.) has been recorded throughout England but is only found as individual bees and not as nests. A similar situation occurs in Germany and the speaker queried whether *B. ruderatus* was a genuine species or a colour form of *Bombus hortorum* (L.).

As part of his survey work on the current status of these declining bumblebee species the speaker has investigated the habitats where they continue to occur. These are mostly unimproved grassland where there is a plentiful supply of flowering plants to provide nectar and pollen throughout the nesting period. Plants which are of particular importance to bumblebees are red clover, knapweeds and birds-foot trefoil. Flower-rich meadows are now uncommon throughout much of Britain as a result of changing agricultural practices. These include overgrazing, especially by sheep, the switch from hay meadows to silage production, and the "improvement" of pastures by reseeding and use of fertilizers. Bumblebees require a large area of habitat to provide sufficient nectar and pollen for their needs. Even areas where bumblebees appear numerous may have only a few nests. The fragmentation of suitable habitats has also led to a decline in bumblebees other than about six species which remain common throughout much of Britain. The speaker believed that a return to more traditional methods of grassland management on farms could reverse the decline in Britain's bumblebees. Set-aside land sown with grass and clover would provide suitable foraging areas that nowadays is absent from much of the countryside.

9 November 1999

The President, Mr S. MILES, announced the death of Mr Darren Walker.

Mr M. J. BLECKWEN showed a live specimen of an ichneumon wasp, probably an *Amblyteles* species which was found on the platform at King's Cross underground station.

Mr R. D. HAWKINS showed a live chinese character moth, *Cilix glaucata* (Scop.) that had emerged early after being reared indoors from a caterpillar collected on 20.viii.99 at Betchworth Quarry, Surrey.

Mr E. PHILP circulated a copy of a Provisional Atlas of Amphibians and Reptiles of Kent published in the *Transactions of the Kent Field Club* 1998 pp. 61–81. This showed the spread of the marsh frog through that county.

Mr A. J. HALSTEAD reported that the rosemary leaf beetle, *Chrysolina americana* L. colony at the Shell Building near Waterloo Station had come through the previous winter. Adult beetles were seen mating on lavender plants on 1.xi.99.

Mr M. SHARDLOW spoke on the work that the Royal Society for the Protection of Birds (RSPB) is doing for invertebrate conservation. The RSPB was founded in 1889 and has now grown to an organisation with more than one million members and 150 reserves throughout Britain. It is the largest NGO in Europe concerned with conservation. It has recently carried out a biodiversity audit of the East Anglian region and has published a report. Of the 615 species in the audit, 16.9% were extinct in East Anglia in 1999; for Biodiversity Action Plan Priority Species the loss is 26%. The causes of this include loss of suitable habitats, changing farming practices and lack of management. Many farmland birds are in sharp decline and the speaker showed distribution maps of the bumblebee *Bombus ruderatus*, the moths the Brighton wainscot, small eggar and the four-spotted moth that showed a similar trend.

The RSPB manages about 104,000 hectares of land in its reserves. It records and monitors the progress of Red Data Book (RDB) and notable species on its reserves through the Biodiversity Monitoring Programme and publishes annual reports. News stories are released to the local and national press when rare species are found. This helps to widen interest in the work that the RSPB is doing and explain the need for habitat management and invertebrate conservation. In recent years the RSPB has undertaken some large-scale habitat restoration projects where farmland has been reprofiled to create ponds, ditches and other features for wildlife, such as at the 298 ha Lakenheath Fen Reserve.

The RSPB is closely involved with the National Biodiversity Action Plan programme. This includes being the lead partner on several invertebrate action plans, including the medicinal leech, the dark bordered beauty moth and the solitary bee *Osmia uncinata* Gerstaecker. The RSPB today is concerned with all wildlife and is keen to work with other societies in order to gain from their expertise. The speaker looked forward to closer links between the RSPB and the BENHS.

14 December 1999

Mr J. BADMIN showed a hungry fly from Hungary. It was an unidentified tabanid fly that came into a restaurant at Keszthely, Lake Balaton, Hungary on 13.viii.99.

Mr D. HACKETT showed some colour transparencies of a dipterous larva found feeding on cabbage whitefly, *Aleyrodes proletella* (L.), on his allotment in Highgate, London. Also shown was a photo and pinned specimens of the adult fly that emerged on 1.ix.99. This was *Acletoxenus formosus* (Loew) (Diptera: Drosophilidae), an RDB3 species said to be associated with hawthorn.

Mr A. J. HALSTEAD reported seeing two specimens of the common darter, *Sympetrum striolatum* (Charpentier), sunning themselves on wooden fence posts round the car park at RHS Garden, Wisley, Surrey on 25.xi.99. This species is usually the last dragonfly to be seen, a fact noted by Cyril Hammond in his *Dragonflies of Great Britain and Ireland* (Harley Books 1977). On p. 54 he quoted a date of 20.xi.1939 as the latest date known to him. Apart from a few light ground frosts there had been little real cold weather in the Wisley area before December in 1999.

Dr J. MUGGLETON said that 191 members and 49 guests signed the attendance book and there were 145 exhibits. Forty-nine people attended the Dinner. The questionnaire had been completed by 87 members and one guest. Sixty-four persons (72%) were satisfied with the current venue, 16 (18%) were dissatisfied and 8 (9%) were satisfied with reservations. The main points of dissatisfaction were parking prices, London traffic and journey difficulties. As an alternative venue, 36 persons would be happy with Kempton Park Race Course (where the AES hold their Exhibition) but 49 would not prefer the venue; 3 would be happy with either. Dr Muggleton pointed out that the hire charge for Kempton Park would be in the region of £6–7000 and the BENHS would have to charge members an admission fee to offset this cost. If this had been known when the questionnaire was filled in, the attraction of Kempton Park may have been reduced. Next year's Exhibition will be on 11 November at the Sherwood Hall, Imperial College.

Mr C. PLANT gave a talk entitled 'an entomologist in Hungary'. He has visited that country on several occasions during the 1990s, sometimes in the company of Lance Gorman and Steve Garland. Hungary has many attractions for entomologists who want to venture outside the UK. It can be reached by car in 14 hours from England and has many rich and undeveloped areas of countryside. Hungary is landlocked in central Europe and can be broadly divided into three areas. The western part is climatically similar to western Europe, the southern area is flat open country with a mediterranean climate, while the eastern part is colder. A map of Hungary shows the country well provided with roads and railways but the reality is somewhat different. Many roads outside the towns are in a poor state of repair and can only be travelled at restricted speeds. Hungary offers good opportunities for off-roading. One site the speaker was taken to required a 3 km drive along a wet river bed with a further 7 km across country to reach a remote hunting lodge where they were to stay. National borders are ill defined in remote areas and armed border guards are a hazard to be borne in mind. Perceptions of what is common or rare have to be reassessed when looking for insects overseas. Mr Plant was taken to one of the few places in Hungary where heather grows and granted a special permit to allow him to collect a particularly rare species known to occur there. This turned out to be the beautiful yellow underwing moth, *Anarta myrtilli* L. On the other hand, other moths, such as the Essex emerald, Burren green and oracle moth were abundant in calcareous grassland areas. Rare British deadwood hoverflies, such as *Doros profuges* (Harris) and *Calliprobola speciosa* (Rossi) were seen frequently in woodland. Slides of these and other insects, including longhorn beetles, chafers, buprestids, horse flies, bee flies and mantids, wild flowers and scenery of Hungary were shown. An added bonus for visiting entomologists is the low cost of food and accommodation.

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JOHN MUGGLETON
Honorary Secretary

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY
VOLUME 13, PART 3, OCTOBER 2000

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